739-752
754-756
759-760

766-776
782 9 767-751

39 of 47

Number 739 Thursday, January 8, 1981 Price 25p

160B

Briefing

Jobs threat at Data 100

THE wave of redundancies now looks like sweeping over Hemel Hempstead-based Data 100, the firm best known as a supplier of IBM-compatible remote batch terminals. Its *US* parent has announced that 300 employees will be made redundant in its operations outside the US as part of a major shake-up involving a $125 million write-off (see Company News, Page 10).

Data 100's former US parent was acquired in 1978 by Northern Telecom, the Canadian telecommunications giant. The goodwill held in Northern Telecom's books since then has now been written off.

Software show

LONDON is to get another software show, to be held at the Wembley Conference Centre from December 1 to 3. The international Packaged Software Conference and Exhibition will be run by the Illinois-based Hitchcock Publishing Company. *The company is* entering a hotly contested race to provide a software market in Europe, and the new show rivals ICO's Soft '81, planned for September 2-4.

Big bubbles

SHIPMENTS of bubble memory devices will increase from $18.4 million in 1980 to $226 million in 1985, *an average annual growth* rate of 68 per cent, according to a report from the Venture Development Corporation of Massachusetts.

£4m order

THE Solartron Industrial Systems Group, part of Solartron Schlumberger, has won an order worth £4 million from the Central Electricity Generating Board. It will supply systems to monitor generators and transmission equipment at the new Drax power station at Selby in Yorkshire.

Gas by VDU

A VDU order which is expected to grow to a total of 600 units, worth over £1 million, has been placed with Videcom by East Midlands Gas. The initial order, valued at £50,000, is for eight screens and associated communications equipment. The Videcom will integrate its terminals into EMGAS's existing Univac 1100 based network.

Cut-price

A BOOST for Birmingham ratepayers has come from IBM which has cut the price of the corporation's new 3033N based system from £1.9 million to £1.65 million, a saving of £250,000.

Unix-versal?

WIDER commercial applications for the Unix operating system are planned by Keen Computers, Dr [illegible] Keen told a seminar organised by the company in Nottingham. The Bell Laboratories system had found its previous major market in education. California consultant Paul Miller said that a micro-based version which has the same computing power as the [illegible] BC 11/44 for about a third of the [illegible] is booming in the US.

FIRST BRIEFCASE UNIT WITH FULL KEYBOARD SPEARS MARKET ENTRY

Sony shakes up WP world

Sony's portable word processor, the Typecorder, records text on microcassettes for printing out on arrival at the user's office. Each cassette can hold 120 pages of text.

JAPANESE consumer electronics giant Sony has made its eagerly-awaited entry into the word processor business with a revolutionary portable keyboard and a series of desk machines aimed at the higher end of the market.

A wide range of accessories is to be offered including a device for driving an electric typewriter and an acoustic coupler.

The portable Typecorder unit includes a full Qwerty keyboard, a single-line liquid crystal display, 2Kbytes of memory and a microcassette drive.

Weighing three pounds, about the size of a clipboard and 1½ inches thick, the Typecorder is the first realisation of the idea of a portable word processor that has been discussed in research labs for years.

It competes with the British Microwriter, which is smaller but has a non-standard chord keyboard.

New model

The Typecorder is aimed at executives and surveyors, for example, who would like to compose documents while travelling in *trains or planes. The unit costs* $1,400 and needs another device for printing out the documents.

For this, Sony offers an interface to any standard communicating printer; alternatively, a new model of portable needle printer is offered, weighing nine pounds and costing $800. This has a resolution of around 20 by 30 dots per character.

The Typecorder can also be attached for output to an actuator, which sits on top of an IBM golfball typewriter, presses down the keys with solenoids and costs about $600.

Typecorders can act additionally as dictating machines, recording the sound on the same cassette drive as that used for text.

Full-page screen

Sony designated its range of ordinary word processors the Series 35. This starts at $9,000 with a single-line display, twin micro-floppy discs and daisy-wheel or equivalent printer and at the top of the range has a full-page black-on-white screen at a total cost of about $13,500.

The micro-floppy discs are Sony's own development, 3½ inches *in diameter and holding* 437,500 bytes each. It is planned to sell these drives OEM as well as in Sony products.

The products are due for a US launch in June but plans for Europe are not yet settled. All the equipment will be made by Sony in Japan except for the standard printers, which will probably come from NEC, Qume or Diablo.

White-on-black screens have very high resolution, showing quality type fonts with lines justified on the screen. The image can be split, showing two documents side by side and reduced in size.

This makes it especially easy to transfer text from one document to

● Turn to page 20

W. Germany sets the pace

WEST GERMANY is expected to have the highest rate of growth in its electronics industry in 1981 throughout Western Europe according to *Mackintosh* Consultants of Luton. An increase of over 13% should produce total sales of nearly $27 billion.

The UK is expected to come second with a growth increase of nearly 13% in 1981 to approach $20 billion in sales. In France growth should increase at 12% while sales will exceed $20 billion.

The new *Mackintosh* Yearbook forecasts that electronics in Western Europe will become a $100 billion a year industry in 1981. But the combined Gross Domestic Product is expected to increase by only one per cent.

According to Mackintosh, sales in electronics *will rise from* $92 billion to $103 billion in 1981 and continue to rise at between 11 and 12% until 1984. The UK's share of the European market has risen from 16% in 1978 to 19% in 1980.

The main area of growth up to 1984 will be in the electronic data processing sector which is predicted to increase in market value from $16 billion in 1979 to *$42 billion* in 1984 *for Europe* as a whole at an average annual growth rate of 21%.

The European office equipment market is expected to double from the 1979 figure to *reach more than $8.5 billion* by 1984. Photocopying equipment will increase threefold between 1979 and 1984.

Mackintosh foresees the consumer market as a continuing problem area with an almost static market between 1981 and 1984 at around $15 billion a year. For example, the novelty of video games, which will have sold around 4.2 million units in 1980, *will wear off* by 1984.

MBE for Quest Automation director

ERIK WARD-ZINSKI, sales and marketing executive of Quest Automation Systems, was one of several people from the computer and computer-related industries in the New Year honours list.

Polish born Ward-Zinski was awarded the MBE for services to export. He has been with Quest since 1972, currently serving as director of East European sales. The company is one of the UK's largest exporters to the USSR and East Europe thanks to the success of its GAD/CAM computer aided design and manufacturing kit.

George Jefferson, chairman-designate of British Telecom, became Knight Bachelor for his services to export as chairman and chief executive of the dynamics group at British Aerospace.

MBEs were awarded to Kenneth Brown, managing director of AB Electronic Components for charitable work with educationally subnormal children, and Christopher Metcalfe, who retired at the end of last year as director of the Telecommunication Engineering and Manufacturing Association, for services to export.

The British Empire Medal was given to James Broughton of Marconi Space and Defence for services to export.

INSIDE THIS WEEK'S CW . . .

JOB OPPORTUNITIES: Pages 23-39

Reshuffle boost for DP industry

THE computer industry's influence in government has been given a major boost by the appointment of Kenneth Baker, MP, for St Marylebone as a Minister in the Department of Industry.

Doug Eyeions, of the Computing Services Association, described himself as "delighted" at the announcement, since Baker had long taken an interest in the industry and has been a director of Geest Computer Services, and a consultant to Logica.

Baker is expected to take over responsibility for Information Technology from Adam Butler, who is moving to the Northern Ireland Office.

Paul Channon, who had responsibility in the Civil Service Department for the Central Computers and Telecommunications Agency, is being replaced by Barney Hayhoe, from the MoD.

هذا هو الأصل

COMPUTER WEEKLY

Vol. 30 No 739
Thursday, January 8, 1981

Editor
Simon Timm 01-661 3122

Deputy Editor
Brandon Gamester 01-661 3124

Advertisement Manager
Harry Hutson 01-661 3101
01-661 3102

Class Ad Manager
Brian Durrant 01-661 3106

Publishing Director
Dr J. A. G. Thomas

Editorial Director
Chris Hipwell

IPC Electrical Electronic Press Ltd,
Quadrant House, The Quadrant,
Sutton, Surrey SM2 5AS
Telex: 892084 BISPRS G

Branch Offices:
Birmingham, Lynton House,
207 Walsall Road, Birmingham B42 1BA.
Telephone 021 356 4838

Manchester: Grove House,
Station Road, Old Trafford,
Manchester M16 0WL
Telephone: 061 872 8861

New York: 205 East 42nd Street,
New York NY 10017.
Tel (0101-212) 867 2080

Published weekly on Thursday.

Registered at the Post Office as a newspaper. Price per copy 25p

©IPC Business Press Ltd 1981.

EDITORIAL
The following editorial staff can be contacted on 01-661 3500, with the extensions shown:

Keith Jones	3535
Rory Johnston	3534
Kevin Cahill	3539
Claire Gooding	3541
Eileen Steiner	3540
Paul Fisher	3538
Donald Kennett	3536
Mike Marples	3546
Nancy Pocock	3545
John Burl	3543
Julie Cotterill	3544

ADVERTISING – Display.
The following staff can be contacted on 01-661 3500, with the extensions shown:

Chris O'Hea	3804
Ian Carter	3672
Xenia White	3571
Steve Bass	3570
David Hogan	3570

Manchester
Harry Aiken 061-872 8861

Birmingham
Ken Parrott 021-356 4838

ADVERTISING – Classified
The following staff can all be contacted on 01-661 0121:
Chris Prier
Ken Walford
Ian Faux
Neil McDonnell
Denise Smith
Julia Hannaford
Kevin McOwan
Gillian Johnson

Manchester
Owen Kelly 061-872 8861

Birmingham
Vic Sherot 021-356 4838

ADVERTISING – Production
The following staff can be contacted on 01-661 3500, with the extensions shown:

Steve Lever	3104
Peter Regis	3575

Computer Weekly has a circulation each week of over 94,000 including the highest fully requested circulation in the UK.

Computer Weekly is sent free of charge to the following categories in the UK and Eire only: Company directors, company secretaries, management service executives, civil servants responsible for computing, management/computer consultants, instructors and teachers, DP manager/supervisors, systems analysts/O&M officers, programmers, operators, computer salesmen, field engineers.

Controlled circulation department, IPC Business Press [illegible]

ISSN 0010-4787

COMPUTERVIEW

Limping into '81

TO anyone with a clean sheet of paper in front of him and a year as yet unstarted staring him in the face, the urge to prophesy is irresistible. The year just deceased was all too obviously blessed by the ancient Chinese curse: "May you live in interesting times."

The curse seems destined to continue exercising its influence in the year ahead.

During 1980 a tone that marked every conference at which a user got a word in edgeways was deepening doubts about database. 1981 will see these doubts accelerate into positive action, with more and more users questioning the price performance, not to mention the organisational relevance, of the database idea as currently sold.

Any search for an alternative concept and technique to better match the computer to the organisation is guaranteed to lead to more and more interest in the ideas of Stafford Beer – a man not so much neglected as shelved by those in the big corporations who did not like his involvement in Chile or the challenge to centralised processing in his publications.

The 64K chip will arrive, at least in prototype, and the 256K chip will be announced in detail, probably by the Japanese. Users will move even more rapidly away from the conventional mainframe, with rental rather than leasing becoming the norm as '81 gets under way. The boom in small business and home systems will continue, though the real take-off is not likely to occur until economic recovery really begins – with a budget U-turn in March 1982?

Hidden in ICL's poor presentation of its bad results was an improvement in the sale of services and software. 1981 is likely to see modest growth in this area, for ICL and most other vendors.

The industry will limp through 1981, failing to capitalise on the massive potential in this area. The epitome of the failure can be seen as the slow growth in Prestel, due almost entirely to low commitment to volume production by the manufacturers and high pricing for entry into the service.

To escape the tightening noose of monetarist policies, the government may attempt to separate capital investment for public services from the current definition of the Public Service Borrowing Requirement. This would have a major impact on British Telecom, allowing it to raise the capital to finance the projects which should have been started years ago. Principal beneficiaries must be the public service voice and data networks.

The meanness and inconsistency which have characterised the government funding policies for the computer industry will not only continue, but get worse. The lack of UK investment policy will be highlighted by the continuous high investment in basic technology by the Japanese and Americans. Compared with the Japanese, the UK is no longer in the race anyhow.

Back at the clearing banks, though, there are signs of change. The Lever/Edwards attack on loan/collateral ratios launched through the Sunday Times has had enormous impact, and may lead to a relaxation and subsequent increase in funds available to small businesses. A further attack on the bad debt provisions of the clearers may also have the effect of releasing more cash for industry.

And finally, the Stock Exchange's Unlisted Security Market will see the emergence of many small and medium-sized computer firms in the public arena. At least 20 companies are known to have firm plans for entry and at least twice that number be expected to emerge during the year.

And now for some gossip.

Down in the City the knives are out ICL's management team, and a major bo reshuffle cannot be ruled out. The rump those who prevented Geoffrey Cross fr rationalising the product line are said to the target. On top of that, Philip Chapp will be under the spotlight during the year much for his own performance as chairma as for ICL's performance. Deeper in t crystal ball are possible structural change ICL looks for ways out of its mainframe lease funding impasse.

Finally, the Nostradamus bit.

At the lower end of the market for bu ness and personal systems there is littl distinguish several of the smaller syste from each other except price. At some p Sord, a company which has still to mak serious impact in the UK, may notice t reduce the price of its kit and becom serious competitor for Pet and Apple. S was selling 1,000 systems a month in Fra last year and brought a threat from t French government of a total ban on Ja nese computer sales to France, if Sord not become less aggressive.

May you live in peaceful (and less i teresting) times.

LETTERS to the EDITOR

Ability more important than language speciality

MAY I take up the discussion on Basic and Pascal and comment particularly on the letter of David Burdett (CW, December 4, 1980). He comments on the fact that there are more Basic programmers than Pascal programmers.

Surely he is confusing two different characteristics: an ability to program and a knowledge of a particular language. The first is the more valuable but is the more difficult to acquire. Many people acquire the two together and then fail to distinguish between them. Certainly employers seem to look more for language knowledge than programming ability. However, a person who can program well in one language usually finds it relatively easy to learn another.

If, however, a person has learnt a language without fully appreciating how to tackle and solve problems and without acquiring the knowledge of a few commonplace algorithms, then he may well have difficulty in changing languages because he has little to transfer. A good programmer should have no problem learning a language like Pascal, once equipped with access to a micro, a mini or a mainframe computer and one of the many good readable books that are available.

With so many variants of Basic in existence, the newly employed programmer most likely has to learn a new dialect in any case. He can do everything that he wants in Pascal and will soon find that the subprogram facility is so much more powerful and easy to use because local as well as global variables can be used.

He can then steadily appreciate the value of structures other than arrays and types other than real and character before learning that pointers can be useful in some applications. He need not know all these in order to program in Pascal at least as well as he can in Basic. However, once started you will have difficulty in stopping him from becoming a better programmer capable of producing more valuable, powerful, legible programs.

Look for good programming ability in *any* language before looking for knowledge of a particular language.

KEITH TIZZARD
Senior Lecturer
Dept of Mathematical Statistics and Operational Research
University of Exeter.

Sales ethics

I WOULD refer to the comments on page six (CW, December 4, 1980) under the heading Fierce Attack on Sales Ethics.

Surely today's professional buyer, when considering on behalf of his company systems and/or equipment of the type under discussion, would first wish:

(a) To compare offers through obtaining more than one quotation.

(b) To ascertain that the system and/or equipment would do what was expected of it through checking with other users.

(c) If replacement equipment, to make sure that it would be m effective than existing equipm and capable of processing w and all at a competitive cost.

As for the suggestion t salesmen hide the truth about products, this must surely be q tionable, for in today's harsh nomic and competitive climat salesperson or management have all the facts available to sure conversion of an "interes purchase.

KEITH BRAU
Director-Gen
Institute of Sales Managemen

ICL in the office

PHIL Dorn's views on the future structure of the computer industry (Doubts of ICL chances of survival, CW, December 4, 1980) should not be allowed to pass without comment.

We, in ICL, are well aware of the importance of office technology and "open system" techniques for interconnecting typical office machines so that any machine or any user can take the initiative.

A central component of the "electronic office" will have to be an electronic filing system, constantly up to date, readily accessible in a conversational mode and at a cost which compares with the cost of only a few office workers.

It is not possible to evolve such a system solely from established computer practice but by including an autonomous file searching subsystem derived from the Content Addressable File Store re cently announced by ICL, a co effective user friendly datab system is quite practicable, a ICL is well-placed to follow su development path.

Moreover, the fortunate po tion of ICL in this matter has be achieved by the ICL research a tivities effectively supported b the State via the ACTP scheme.

Phil Dorn also referred to co munication technology. There many ways of achieving "o systems" so that the critical issu to achieve wide agreement on st dards and ICL is playing its part in such issues.

ALAN A. BENJAM
Corporate Communicati
Direc

ICL House,
Putney Bridge,
London SW6 3JX.

Answering machines users' club

I AM sure you will by now have a good-sized pile of letters from your fellow-sufferers who have acquired some model or other of those detestable answering machines, as I too have done (CW, November 20, 1980). Not only does mine tick, but it misses calls, and jams up solid on occasions (increasingly). And the recording quality is vile.

I came to the conclusion that a re-design is called for, and set out to obtain a service manual. Oh no, quoth the manufacturer, you must send it back to us for repair. And out of the goodness of their hearts they would offer a maintenance contract for £24 p.a. (+VAT, no doubt). But the machine would still tick, and probably all the rest. They flatly declined to provide any data whatsoever.

It occurs to me that we are far from being alone in our predicament. And being of a tinkersome disposition, and having some facilities available, I and a few similarly minded individuals could analyse the hardware and software of the machines without an inordinate expenditure of time, given some co-ordination of effort. In short, a Users' Club.

Should you have like-minded correspondents, I would be glad to hear from them.

P. BARKER

14 Gwendwr Road
London W14 9BG

Bursting with shops

I HOPE that the whole marketing strategy of the new Lion microcomputer shop does not depend on there being just "a couple" of outlets in Brighton, as the executive director is quoted as saying (CW, December 25, 1980).

Brighton is actually bursting with micro shops and outlets of all descriptions. There is a Pet dealer, two Apple dealers, a Tandy dealer, a Hewlett-Packard dealer, a Sharp dealer and a Logabax dealer.

If one includes the whole Brighton conurbation in the area being considered (i.e. Shoreham and Worthing) there are two more Apple dealers, a Sord dealer, a Zilog dealer and, moving up-market, Burroughs, Diablo and Texas Instruments dealers.

While it is very nice for the customer to have such a wide choice of computers available, I really do wonder whether the market can support so many outlets. Particularly in the current recession, I fear that quite a few of them may not survive.

DELIA VENABLES

Microcomputer Advisory Service
Lewes,
Sussex.

1984 and all that . . .

CONTRIBUTIONS from readers are welcome for our column of the strange things people say about computers. We will pay £5 for each item we publish.

I suppose everybody today knows that the technology can do anything.

Paul Sieghart on Private Lives, Analysis, BBC Radio 4

BBC-TV plans micro educatior series

BBC Television is planning a series of microcomputer education programmes, likely to be transmitted in October, which will incorporate the use of a specific BBC microcomputer. A version of the Newbury Laboratories' NewBrain is being considered.

The series, a set of ten half-hour programmes, will be accompanied by a number of publications on different aspects of computing, an associated course on Basic programming, to be run by the National Extension College, and the availability by mail order of a microcomputer for under £200.

The BBC would not comment to whom the contract would go, but confirmed that if the project goes ahead the system will be marketed by BBC Enterprises. This is an entirely separate entity from the BBC and cannot inject finance back into the programmes if the project is a success.

Rob Saar, the new managing director of Newbury Laboratories, confirmed that discussions are taking place with the BB of Basic on an adapted the MB unit, which costs £... and runs off battery or mains.

The NewBrain series of three units, the M, the MB and the MBS were announced last spring (CW, July 3, 1980) for a September launch, but are now not expected to be on the market until April or May of this year. Its price range more than its superior quality made the NewBrain at that time a certain competitor for Clive Sinclair's ZX80.

Saar told Computer Weekly, "The BBC wants to incorporate its own ABC Basic on to the NewBrain, but discussions are going on because we already offer a modified Basic, and it would delay the project further if we had to change hardware for this."

Other systems the BBC is likely to consider are the Sinclair ZX80 and the Acorn Atom. Whichever company wins stands to gain an order in the thousands from BBC Enterprises.

Newbury Laboratories' NewBrain portable microcomputer is expected to be used for the BBC's new series on microcomputer education, planned for October.

ICL terminal cuts out the numbers

ENTERING numerical information can be dispensed with on the Option Selection Terminal from ICL, an intelligent VDU with 250 keys, each assignable to represent a particular item. It is aimed at non-ICL users as well as ICL's own user base.

The first OST users in the UK are Heinz, the food giant which is using two pilot units in a telephone sales application and Northern Clubs Federation Brewery.

The latter is the organisation that is installing ICL 2903 and 2904 machines at its Newcastle headquarters linked to terminals at depots around the UK.

Heinz is expected to install a total of 25 OST's with Northern Clubs taking up to 10 – but the biggest customer lined up so far is Paris-based French steel distributor Nozal, which is expected to install 100 units.

The 250 OST keys are software controlled and their designations can be changed by swapping keyboard overlays.

Each key contains an LED display enabling it to be highlighted if necessary. Cobol programmability and floppy disc storage provide the OST with standalone processing capability.

Philips adds to WP range

PHILIPS has added a second model to its range of word processors, a screen machine of advanced physical design with detachable keyboard and a simple means of user programmability through the storage of operator keystrokes. Called the P5003, the new machine is in software terms similar to the existing P5002 and was, like the older model, developed in Canada by Micom.

A two-disc version with Qume daisy-wheel printer costs £9,210, excluding the software. Several software packages are available, with purchase prices of between £100 and £400, providing sorting and merging for mail shots, arithmetic, and the programmability which is known as Keystroke Memory.

Using Keystroke Memory, a sequence of key depressions making up a particular editing or printing operation is remembered by the machine, and can be reproduced automatically later.

DoI launches search for funds for micros in secondary schools

THE Department of Industry is seeking ways to fund a scheme to provide all secondary schools with a microcomputer as part of the government's programme for promoting Information Technology.

This was announced by Reay Atkinson, of the DoI's newly-formed Information Technology Division, at the Online Information conference in London. Atkinson added that he and his Minister Adam Butler (who on Monday was moved by Mrs Thatcher to the Northern Ireland Office), were calling for people with ideas on the whole area to contact them.

"We are operating an 'open door' policy in this respect," Atkinson said, describing his division's work in compiling a broad information technology policy that will be put to the government early this year.

Its main task is to find still more ways of spreading awareness of computing, particularly among people of influence, Atkinson remarked.

At present, around one-third of secondary schools have computers, obtained either with local funds or through the DoI's competition.

The Department of Education and Science is concentrating on providing software and teaching material and is not involved in the DoI's latest thinking.

Other elements of Atkinson's Information Technology programme are improving national digital networking facilities, promoting standards and applications, and providing financial support for new products.

Regarding applications, the government is planning to implement some "highly visible development projects" within the Civil Service, thus helping the UK supply industry, Atkinson said.

It also plans to act as a catalyst for developments with such information-using industries as banking and insurance, bringing them together with suppliers.

Barry Mahon of the EEC told the conference that Euronet customers were beginning to get over the many problems that had been encountered in the network's first year of operation.

Mahon admitted that Euronet had "not been as effective as we wished", but said the service was improving now and 14 new hosts were expected to be added in the next few months, including the Commission's own statistical data bank.

A familiar figure at these conferences, David Martin, formerly boss of Infoline, has been appointed to a new post at the head of the British Library's Blaise system.

Martin will oversee new computer applications besides the existing service operation and marketing. He left Infoline when it was bought by Robert Maxwell's Pergamon Press, the service having run into major delays and cash shortages.

CBS to try out Antiope

CBS Broadcast Group in Los Angeles is borrowing one million dollars' worth of teletext distribution and broadcasting equipment from Telediffusion de France for a one-year trial starting in April.

Installation of the French Antiope broadcasting equipment and Didon transmission equipment for distribution of text between television stations begins this month and TDF will also provide staff training and engineering support.

French teletext receivers will be installed in publicly-accessible places during April and about 100 will be installed in viewers' homes later in the year.

Following experiments with Antiope and the UK's Ceefax and Oracle systems in 1979 at two television stations in St Louis, Missouri, CBS leaned in favour of Antiope and petitioned the Federal Communications Commission last July to declare Antiope the standard for US teletext.

Other broadcasting organisations protested that CBS had stymied industry-wide deliberations on the subject, to which CBS was party, in which it was outnumbered by supporters of the simpler UK designs.

The FCC has been reducing its regulation of the industry and is thought to prefer market forces to select the standard. The aim of the current test is to explore teletext uses and get a feel for the market.

Downtime

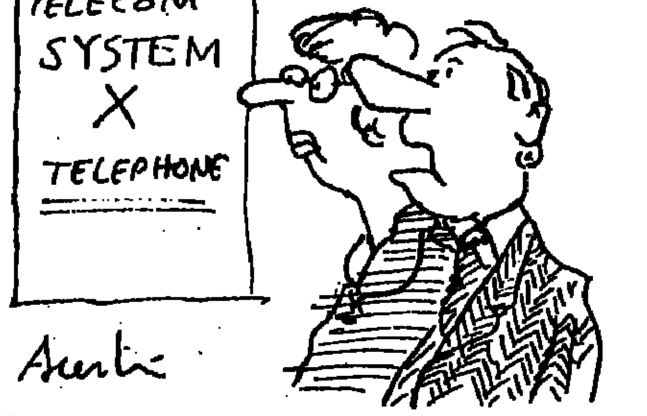
by Chad

Roman holiday

THE Italians aren't quite as hopeless technically as they are made out to be, I am assured by Barry Mahon, of the Euronet staff in Luxembourg. The Rome node of Euronet was out of action for an entire Monday recently, and rumours had been circulating among users that it had been shut down because it was a national holiday.

In fact, says Mahon, there had been a power failure following tests that had been carried out on the Sunday, and they could not get the repairs done because of the holiday.

Of course, from the poor user's point of view, it's the same difference.



"X is an unknown quantity, equal to the number of years it takes to get your phone installed".

Sort out the protesters – by putting them online

A BOMB attack in London the other day was attributed, if I heard right, to "The Armenian October the 15th Group" or some such mysterious body.

My bafflement over these myriad organisations all protesting about one thing or another grew even more intense, and led me to wonder whether an online database of terrorist groups would help a bewildered public sort it all out.

On looking into this, I discovered that someone else was way ahead of me, and once again British enterprise has leapt to the fore. I visited the entrepreneur, Major E. S. Kerboom, at his headquarters, an abandoned concrete pillbox just off the M1. Here he runs Sky-High Ltd and its online service, giving enquirers facts on groups' aims and objectives, their records of achievements, a league table of efficiency such as numbers of "own goals," and where to send donations.

"We provide a service, not just to the public, but to the terror. . .err, progressive groups' themselves," Major Kerboom told me. "For example, names with dates in them are very popular, but there are only 365 dates in the year so there's a danger of embarrassing overlap. We keep a file of which dates are taken and which are free, but I'm afraid there aren't many left now. It won't be long before we hear of the Patagonian 93rd of Octember Group.

"We also help groups with their advance planning. How disappointing it is to bring off a nice big BLAAAMM only to have the headlines grabbed by another explosion at the same time. We let groups book slots in advance, but naturally we charge more for popular times such as holidays or when there isn't much other interesting news, such as during Party conferences. What really worries me is a client losing its coverage through competition with good news, such as Prince Charles finally popping the question. I'm trying to get the Prince to register with us as well to avoid this danger."

Chewing on his plump Havana, made from tobacco personally picked by Dr Castro, Major Kerboom continued, "We also provide an arbitration service between groups claiming responsibility for the same bang.

"Of course we respect scrupulously the privacy of our customers," the major asserted, adding proudly, "We're the first people fully to implement the Lindop Committee's proposals on Data Protection. This was tricky though, because strangely enough the Committee said nothing about a code of practice for terrorist online systems."

To encourage business, Sky-High Ltd is offering a prize to the organisation causing the most havoc to London rush-hour traffic combined with the most obscure aims. I've heard a tip that the Norwegian Antarctic Territory Penguin Liberation Front has a commanding lead in this race.

Clouds

Any clouds on the horizon? Major Kerboom scowled. "What really worries me is overseas competition. My rivals in Algeria, Libya and North Korea are heavily subsidised by their governments. How can I be expected to make a profit with the pound as high as it is?"

His voice quavering, the major went on, "Our government is supposed to be in favour of enterprise, yet they won't give me a rotten million or two for my development programme. I'm even prepared to buy an ICL computer."

TEN YEARS AGO

From Computer Weekly of January 7, 1971.

AFTER only nine months' operation Computicket, the International Publishing Corporation's computerised theatre ticket booking subsidiary, is to be closed, having lost nearly £2,000,000 . . . Almost half its staff, from divisional management downwards, has been made redundant by Computer Enterprises Ltd, the Ealing-based consultancy and software house . . . Mr Murray Laver, the Post Office board member for data processing, was made a CBE in the New Year Honours List . . . A new and powerful contender in European markets for communications equipment, computer peripherals and computer services, is likely to emerge as a result of plans currently being implemented in the UK by General Telephone and Electric Corps, one of America's top 20 corporations.

FOCUS

Time to come to the aid of the first-time user

THERE is probably no better theme for the New Year than that of micro training. With high street stores jumping aboard the micro bandwaggon, it is essential that the computer industry comes to the aid of the user and prospective user party.

Unfortunately, it seems the industry has not yet got the micro message. Such DP establishment worry beads as are in evidence concern the training and provision of installation personnel.

Shoulders, whether cold or otherwise, are turned away from the plight of the first-time micro user.

The NCC is setting the industry an example by erecting a new London Training Centre for basic Cobol courses in January. The NCC, in association with NEDO, has identified a national shortage of 16,000 programmers and analysts.

Certificate

This shortage is expanding at a high rate with over 500 extra programmers a month required over the next five years or so.

To deal with this situation, the NCC has devised a one-week basic Cobol "Introduction to DP" course for trainees without previous computing experience.

The NCC suggests that students may undertake project work with a view to taking the City and Guilds basic certificate in computing when they have completed the course.

Even allowing for the fact that the NCC course deploys colour video training and microcomputer aids, the modest one-week period does appear rather suspect.

The organisers have no such reservations and the course will provide experience of designing, developing, testing, debugging and maintaining Cobol programs besides basic hands-on experience.

If this is the case, there is a strong probability that every DPM in the land will enrol his entire installation team, plus himself.

Target area

Whether the State-supported NCC has got the right target area is debatable. There are already many training and teaching courses available to the professional programmer – most DPMs could produce a folder full of names, addresses and fees.

Where practical training, with or without hands-on procedures, would prove beneficial is in the fast-expanding area of microprocessor-users. It is the current and potential micro user who is in most need of industry care and attention.

All too often, the micro purchaser discovers only after the new product has been unwrapped that, far fom being a boon and delight to his organisation, the equipment presages doom and despair.

Standard limitations include lack of flexibility, enhancement and all too often, practicability.

Selling a personal computer system to the home hobbyist or professional DP man is good and honourable.

Selling the same system to a non-DP specialist businessman should be a matter for industry concern, particularly if the user discovers too late that an associated VDU or TV screen is an essential extra.

Expensive

It is becoming commonplace for DP specialists to be asked to provide help and guidance covering such basic micro matters as software, coding and processing timescales. Even matters like data stationery and media input appear to cause strain and aggro.

Perhaps the industry would be better occupied protecting the micro user from abuse, micro equipment from misuse and preventing /// supplier from being able to take users for expensive rides.

If the NCC cannot devise practical courses on the needs of the micro user, maybe it could set up a National Micro Users Forum as a useful corrective.

Only a strong and respected organisation such as the BCS or NCC could bring pressure to bear on the micro industry.

This pressure should include the requirement for all micro equipment to carry an industry health warning label along the lines that "This equipment can damage your health and that of your company if not handled correctly."

Michie's Privateview appears in debate form this week on page 16.

NEWS IN BRIEF

Introducing FINAPL

A FINANCIAL modelling system developed by Manchester-base software specialists Fars Compute Services will be made available o the APL★PLUS time sharing se vice run by STSC (formerly Scie tific Time-Sharing Corp) America.

Called FINAPL, and written APL, it aims to provide accou tants with budget, financi strategy and investment apprai tools and joins the existing FP large-scale financial planni system.

FINAPL runs on STSC Amdahl 470/V6 and IBM 370/1 linked via Tymnet and priva lines to its 18 US and fo European offices. APL★PLUS marketed in the UK b APL★PLUS Ltd in London.

Analysis pack

A CRITICAL path analysis pa age which will run on any mic system supporting UCSD Pasc such as the Apple II has been a nounced by IBC Compute Systems of Macclesfield. A typic network of 1,000 activities wi take 12 minutes to analyse. Abo 32,000 activities are available o the system. Cost, including th ACI-90 micro recommended fo optimum performance, dua floppy disc unit, VDU, printe and CPA software, is arou £5,500.

Recognised

CANADA'S geometric method transmitting graphics to viewda terminals has received recogniti from CCITT, the internation telecommunications committe following the Canadian Comm nications Ministry's howls at bei overshadowed by the British a French systems at the last meeti of CCITT in June (CW, July 1980).

Distributor

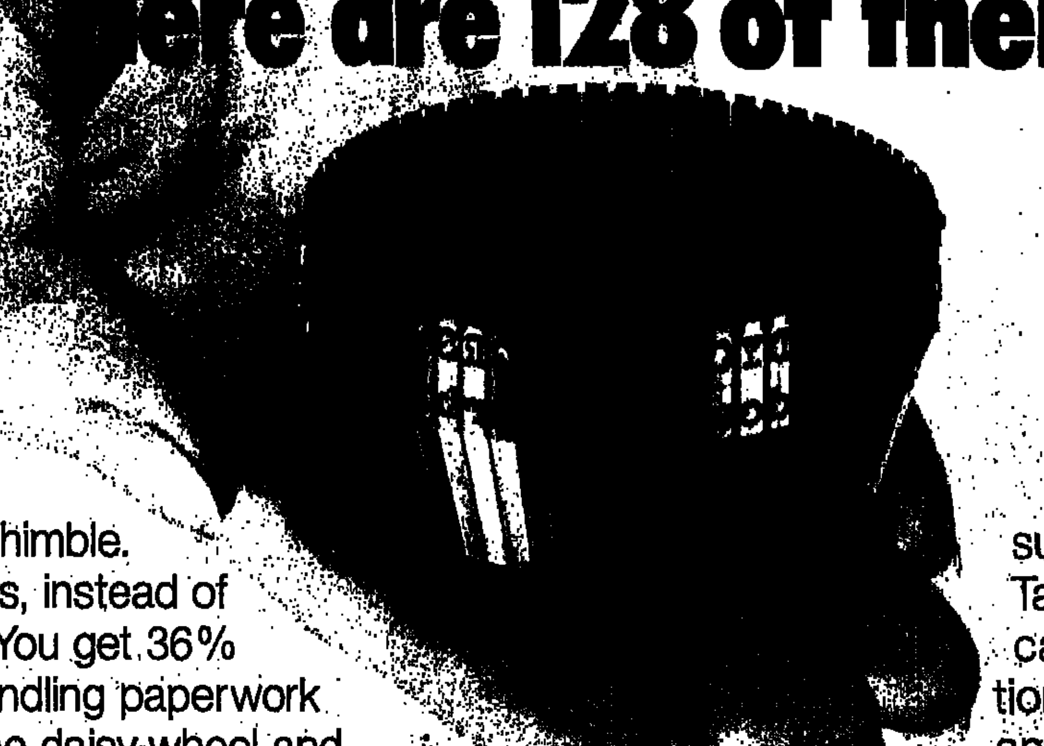
VIEWDATA Business Syste of Camberley, Surrey, the new o shoot of Ansafone (CW, Octob 2), is to distribute ITT's viewda products, starting with an £ colour terminal with a 16-in screen and a choice of numer alphanumeric or editing ke boards. The terminals can also rented for £85 a quarter.

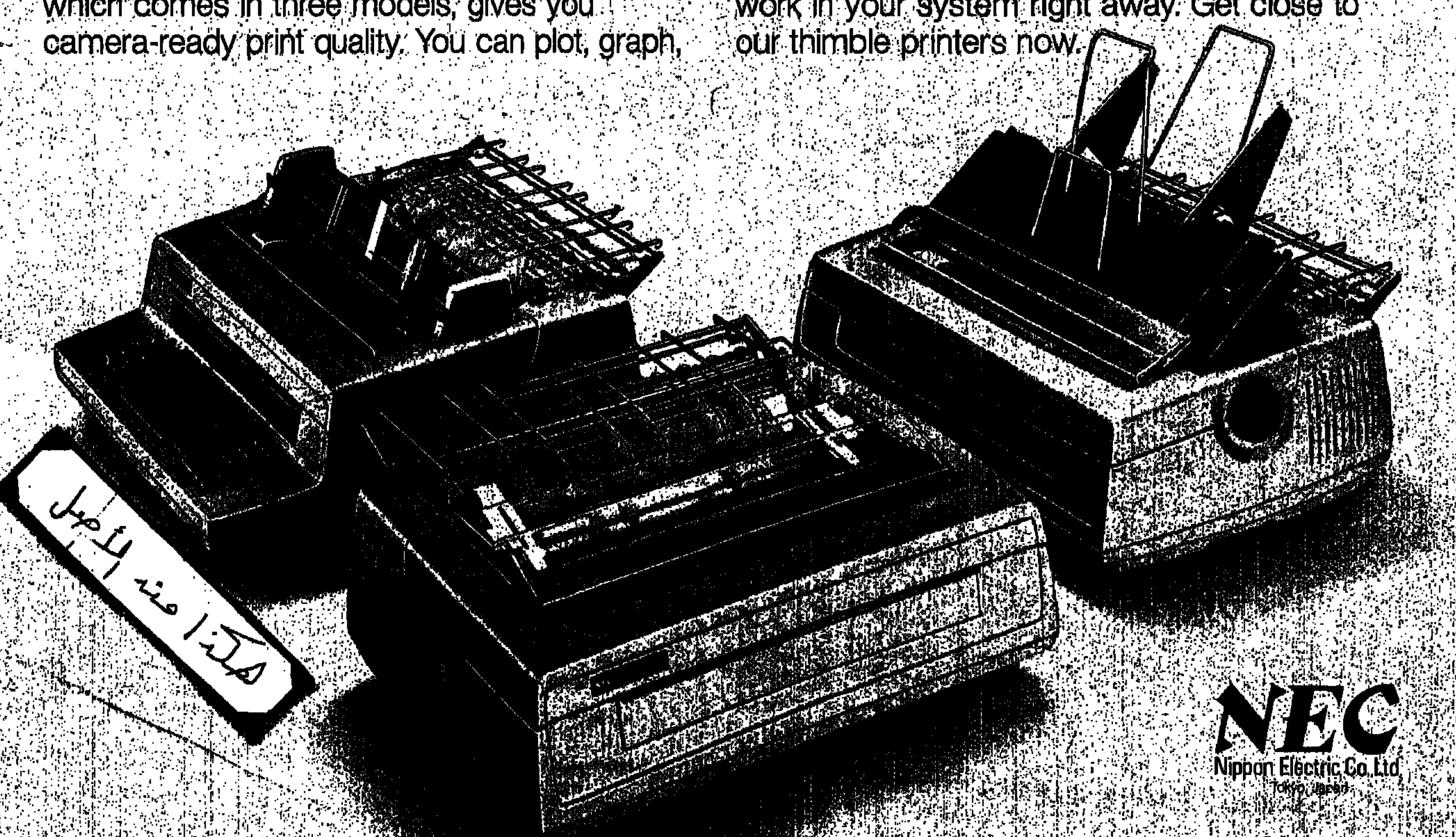
400 for 20 places

COMPUTER fever struck Mi land school-levers when over 4 of them applied for 20 places o government-sponsored course Birmingham's Bourneville Colle of Further Education. The cour starts this month and another planned for April. The studen will get £26 per week grant.

BCS dates

OPEN systems interconnecti will be the subject of the Brit Computer Society Data Comm nication specialist group's fi meeting of the year on January at BCS headquarters. Clive Wo of the European Computer Man facturer's Association Protoc Committee is to talk about de velopments within the Int national Standards Organisatio seven-layer model. Subseque meetings are planned for Marc and May 19 on System X and cr tography respectively.





Helping hospitals in UK to catch up...

US hospitals' technological lead over those in the UK may be shortened by the UK launch of two hospital administration and "patient care" systems.

Both systems have been operating for some years in the US and have been adapted for use in UK hospitals, which are many years behind America in computerisation.

The two companies are EDS World Corp (UK) and British Medical Data Systems, formed as a joint venture between BOC Datasolve and the US company Shared Medical Systems.

After more than 18 months of development, British Medical Data Systems will be announcing its system, known as Action, in February. The American version of Action marketed by Shared Medical Systems is already operating in more than 600 hospitals, the one major change which had to be made for the UK being the removal of the facility for billing patients when they leave.

Ironically, BMDS' first order is for the Cromwell Hospital in London, a private hospital. However, the company emphasises that Action is suitable for any hospital in Britain.

NATHAN . . . expecting a million pounds' worth of business.

EDS launched its Patient Care Information System (PCIS) last month. Marketing director Russell Nathan told Computer Weekly that PCIS is expected to generate at least £1 million worth of business over the next 18 months.

This represents about 10 hospital orders at an average value of £100,000 apiece.

At present, NHS computing is confined mainly to the regional level, and to specific functions in individual hospitals.

At the hospital level computers are used mainly for patient records, handling admissions and visit schedules and in laboratory work, for the collection and analysis of data.

The systems offered by ECS and BMDS, however, are far more comprehensive, tying together almost all aspects of hospital administration. EDS' package is an online interactive system, available in modules so that a hospital can choose the parts most suitable to its requirements.

These might include bed reservations, out-patient and casualty statistics, or automatic facilities for admission of new-born babies.

In addition EDS claims that one of the big advantages of PCIS is that it can take care of the wide variety of orders for services and materials that can bedevil a large hospital. Much wasted effort and frustration often goes into tracking down routine requests from wards, theatres and out-patients, pathology labs and supply departments. PCIS will control the ordering, design and auditing of requisition forms.

Patient Care Information System from EDS is online, interactive and modular.

Though well-established in the US, the only European user of PCIS to date is a 2,000-bed hospital in Liège, Belgium, though EDS is now engaged in serious discussions with two area authorities and hopes to clinch its first UK sale early in 1981.

Both the EDS and BMDS system will be based around a central store of records, supporting a number of terminals distributed through the hospital. An average-sized, 350-bed hospital would require about 10 terminals.

EDS will be using Univac V-77 minis and BMDS, DEC equipment. In both cases the minicomputers will be based on site.

The installation of an integrated hospital computing system will, it is hoped, unburden senior medical staff and nurses of considerable paperwork and enable them to devote more time to the patient. The systems are said to be particularly user-friendly, requiring very little retraining of established personnel.

On the wards themselves much time should be saved by the ability to order drugs and special diets at the press of a few buttons.

The launches come at a time when a new strategy of computerisation is being prepared within the NHS. It is now recognised that in the absence of the motive to make profits the UK has fallen way behind other countries in its use of computers for hospitals and for centralised administration in the NHS.

Permanent international Prestel service expected by next July

PRESTEL International is to become a permanent service probably from next July, and over 90% of the market trial participants are expected to continue to use it, Prestel deputy director Mike Ford said last week.

Ford, who is in charge of Prestel International, said that a further eight countries including Bahrain, Bermuda and Norway had joined the original seven in the trial, although with only one or two terminals in each.

The permanent service will be based on a GEC 4080 in London and a second in the US is to be added by the end of next year, linked to the first and holding identical information.

Access to public information on the system will be via a network of leased lines terminating in multiplexers in the participating countries. But private information belonging to closed user groups will have to be accessed via public networks, either packet switched or telephone, because of PTT regulations.

British Telecom's IPSS has been used for access from the US during the trial, and Euronet is likely to be used extensively in the permanent service.

Logica will continue to be the main overseas marketing contractor and it plans to set up a separate wholly-owned subsidiary to handle Prestel International.

Competition would be experienced from other types of computer information service, Ford said, "but we feel Prestel International fits in a gap between simple telex and sophisticated specialised high-speed data interchange services."

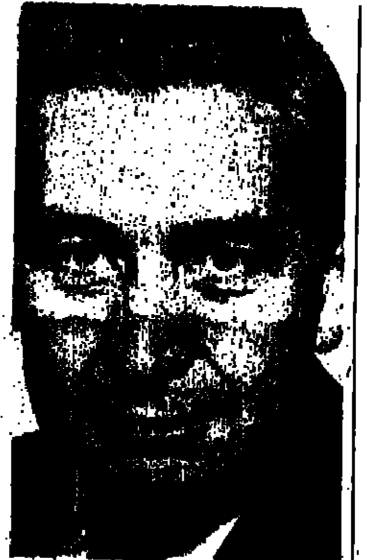
Terminal supply would provide an opportunity for British industry, Ford said, although British Telecom and Logica would not actually be supplying terminals. In Germany and Holland, terminals built for the local Prestel-compatible services were being used in the Prestel International trial.

Other terminals were supplied from the UK by Decca and by the Japanese firm Sony which designed and built them in its Bridgend, Glamorgan, plant.

Participants now wanted improvement in the quantity of information available and to know what the tariffs will be.

Out of 150 companies using 320 terminals in the trial, 73 put information into the system, 43 for their own private closed user groups, four for subscriber closed user groups and 26 for general availability. Over two million accesses had been made to the 20,000 frames held on the system since the beginning of the year.

Frost and Sullivan changed its plans for a closed user group of subscribers to making executive summaries of its market research reports available generally at a price per frame of 50 Prestel International charging units (currently equivalent to 50 pence but not tied to this conversion rate).



FORD . . . "a further eight countries have joined in the trial."

Other uses for the service included daily news from the Wall Street Journal which was available before the paper hit the streets, a supplement to Lloyd's Register of Shipping and commodity prices updated every few minutes by Fintel.

Prestel's lead over rival systems had now actually widened, director Richard Hooper said. Bell Canada's Telidon trial had been delayed from last January till next April with the number of terminals cut from 1,000 to 600.

The French Teletel system was also believed to be expecting a delay from its April target date and to be planning to use central computers rather than relying on information providers' machines as originally intended.

Cheaper UK 9,600 bps modem is intended for Europe

A DROP of £1,000 in the price of a 9,600 bps modem is promised next month by Reading-based Micom-Borer, European subsidiary of the innovative Californian data communications company Micom, which claims to have created the market for statistical multiplexers virtually single-handed.

Micom-Borer's UK-designed 9,600 bps modem will cost about £2,600, is aimed at the European market and will conform to CCITT recommendation V29, unlike its 96 LSI predecessor which is claimed to give a better performance than the V29 specification allows.

Launched a year ago, the 96 LSI is said to have done well in the UK but to be almost unsaleable on the Continent. The three-year-old 48 LSI 4,800 bps modem, of which nearly 1,000 have been sold in the UK, will also be complemented by a CCITT-compatible version costing about £1,300 and available in the summer.

The company aims to develop the European foothold gained through selling OEM to Philips and the Dutch PTT modems, including 300 and 1,200 bps devices and viewdata central-site models.

PTT sales have not included British Telecom so far, but the company has responded to its invitation to tender for 1,200 bps two-wire full-duplex modems.

Plans made since Micom bought Borer from its Swiss security company parent in October centre on enhancing the UK-designed range of modems, some of which will be used to replace the bought-in modem boards built into Micom's US-made multiplexers, and pushing Micom's products vigorously in Europe.

Micom itself has now sold 20,000 of its two-year-old Micro800 statistical multiplexer and climbed to number 22 in the Datamation league table of data communications companies. OEM customers for the Micro800 include Codex and General DataComm.

Rapid growth has been sustained with pre-tax profit levels on sales of at least 20% over the last three years, and it is expected that the US law requiring companies to go public when they reach a certain size will take effect some time next year.

Micom's latest product, the Micro600 port selector launched in the UK last summer and in the UK in November, has forced it to change from selling products over the counter for do-it-yourself installation to providing support by field service engineers.

Pricing starts at £3,000 for a basic table-top device which can be expanded to handle up to 120 channel-ends configured as terminals, computer ports or line drivers. A rack-mounted version starts at £6,000 and can be expanded up to 496 channel-ends.

A typical system—equipped with channel driver boards and control options such as statistical traffic logging, port monitoring or restricted access to certain ports from certain terminals—would cost between £15,000 and £30,000.

Big investments in Ireland predicted

A STUDY into the impact of microelectronics and computer industry developments on the Irish economy is being carried out amid predictions that one out of every two jobs in these industries being established within the EEC will go to Ireland over the next year.

The head of the Irish Industrial Development Authority's electronics division, Martin Lowry, who has been responsible for bringing major computer firms into Ireland, has predicted that by 1985 a total of 30,000 Irish workers will have jobs in these industries.

The study is being carried out by the National Board for Science and Technology, in close consultation with the Confederation of Irish Industry and the Irish Congress of Trade Unions. Government departments and state agencies are also involved.

The first phase of the study has already been completed. It covered the present state of computer applications in Ireland, and indicated that the country is well-placed to benefit from new computer industries.

The second phase will examine all sectors of the economy to provide information for recommendations on future national policies. Already the study group is finding clear evidence that there must be more commitment to education, training and other support services in Ireland.

Cork and Galway plants

THE inflow of computer company investment in the Irish Republic continues with the Irish Development Authority announcement of two new projects.

Beehive International of Salt Lake City in the US is spending £2.7 million to set up a VDU plant in Fermoy, a small town in North Cork. The factory will eventually employ 60 people and Beehive has indicated that it will consider setting up a research centre later.

In the west of Ireland at Portumna in County Galway, MDB Systems of Orange, California is setting up a plant to manufacture PCBs. The factory will eventually employ 40 people.

French aim at US databank market

FRANCE is to be equipped with a £19 million databank for legal information which will go online to the country's courts, law departments of business firms and local government in April.

The Sydoni bank, which is designed to digest four million court decisions and 14,000 pages of the French official legal gazette each year, will be connected via the Transpac data transmission network to a CII-Honeywell Bull 66 computer. Mistral IV software will be used.

The French authorities regard this venture as a major challenge for French technology in a field in which the Americans dominate.

About 70% of the 360 databanks now operating are US-made. France operates only 10% of these banks, representing a mere one per cent of world turnover.

As an incentive to Sydoni, the Ministry for Industry has granted a £9.5 million subsidy equal to the sum put up by the venture's partners, the National Association of Legal Advisers, the National Federation of Tax Advisers, the National Company of Accountants and the Chartered Accountants Council. Legal publishers have also invested in the Sydoni project.

Sydoni could prove a godsend to the French legal profession as well as to the business community.

Lawyers devote at least one quarter of their time to searches for documents. It has taken ten years to compile the input for a databank whose fields of information will cover company, trade, property, social and tax law as well as all the laws, decrees, decisions, circulars and rulings of the Council of State (France's highest court, equivalent to the House of Lords) and the wide range of appeal courts.

The Sydoni databank will be accessible for 11 hours daily, and on Saturday mornings at a cost of £800 a year. This subscription will cover ten hours of connectors. Extra time will be billed at £70 hourly.

MICRO NEWS

by Eileen Stainer

AMD aims to be leader in telecoms industry

Advanced Micro Devices, the US semiconductor company based in Sunnyvale, California, aims to be a major contributor to the telecommunications devices industry, and sees it as the fastest growing market in the world in the 80s. Micro News visited the AMD Sunnyvale headquarters and discussed with corporate affairs man Bob Grossman the company's current situation in this market, and what AMD intends to do in the 32-bit microprocessor field.

FOREMOST in the minds of corporate executives at Advanced Micro Devices is the potential market for standard large-scale integrated circuits in the telecommunications field and not, as trends would dictate, the development of a generation of 32-bit processors.

Telecommunications is seen by AMD to be the fastest growing market in the world for the 1980s. The company's aim is to be a major factor in this industry; that is, to be one of the top two or three companies, if not the first.

Bob Grossman, who looks after corporate affairs at AMD in Sunnyvale, estimates that the telecommunications market will eventually be worth $4 billion.

His figure is reached on the basis of an estimate of 400 million phone lines in the world today, increasing at a rate of 40 million each year. The mechanical unit inside all these phones usually costs about $6.75 in the US, and if replaced with a single chip modem priced at $10, the cost would be $4 billion.

Deep end

The single chip modems which AMD intends to produce to replace the mechanical unit would carry out extra functions such as number storage and forwarding calls. Grossman considers that users will be willing to pay more for these extra convenience facilities.

AMD plans to enter the market at the deep end with third generation devices, having learned from the mistakes made by others in the development of the first two generations. Grossman explained that this will produce certain benefits, like being aware of the constraints when dealing with complex digital signal processing.

Initial telecommunications devices are expected to be seen at AMD early next year. They should include single chip modems, codecs, subscriber line interface circuits and others.

AMD, however, is not paying much attention to 32-bit microprocessor development, believing that the world is not ready for it and does not need it yet.

"Minicomputers progressed to 32-bit operation to be more powerful. This is not really necessary in the microcomputer field," said Grossman. He explained that having a 32-bit processor on a single chip is not advantageous to the manufacturer or the user.

"It is the peripherals that produce the revenue. The CPUs could be given away free, to attract more peripheral sales. The cost of peripherals for 32-bit processors tends to negate the advantage of having a single chip 32-bit system," said Grossman.

Will there be any second source deal between AMD and Zilog at the 32-bit level, similar to the Z8000 agreement where both companies are developing parts of the family?

"Our agreement with Zilog is only for the Z8000 family. We will have to wait and see what Zilog does in the 32-bit market before we can say anything along those lines," said Grossman.

Development

He pointed out that many of the improvements made to the Z8000 chip came from AMD, and the two companies worked closely on the family developments. Faster versions of the 16-bit chip are planned by AMD, with or without masks from Zilog.

At the moment AMD is concentrating on the development of peripherals for the 8000 family. Some 26 devices have been planned with 11 already available in sample quantities, including the 8065 burst error processor, the 8068 encryption chip and the 8160 error detection and correction circuit. These three are also available from Zilog.

Expected early this year from AMD are the 8010 memory management unit, the 8030 serial communications controller, the 8036 counter and I/O port and the 8038 I/O interface, all of which are available from Zilog. The 8016 direct memory access transfer controller and the 8052 CRT controller will be introduced this year by both companies.

Claiming to be the seventh largest semiconductor company in the US and twelfth in the world, AMD plans in the future to be a $500 million company, and it will have the capacity. The new plant in Gilroy, California, will be equivalent to the Austin MOS plant in Texas for bipolar technology.

The new plant will be started in the first quarter of this year and is expected to be in production by the end of 1981. AMD feels that up to now the industry has neglected bipolar technology in favour of MOS and CMOS technologies.

There will be some product overlap between the two plants to allow some devices to be produced in both technologies. The AMZ8000 family will continue in MOS alone, however, and the bit-slice family, the Z2900, will continue in bipolar.

Production of the world's first 16-bit wide bit slice microprocessor (CW, September 18), the AM29116, is due to begin this quarter in sample quantities only. The 2900 series is being used for processor emulation in at least one model by nearly all the world's major minicomputer companies.

An 8-bit wide slice was not considered for development because in most applications the devices are configured into a 16-bit format anyway. The AM29116 in a 48-pin package will have an instruction time of 100 nanoseconds and will be able to execute instructions in either 16 or 8-bit modes.

Compiler for Pascal

A PASCAL compiler for use with Intel's 8088 and 8086 16-bit microprocessors is now available from Rapid Recall. Pascal-88/86 is designed to run on the Intellec Series III development system or on the Series II or Model 800 systems with a model 556 upgrade package.

The compiler has been expanded by Intel so that the machine code can be linked to object files. Two other additions are a set of predefined functions to perform direct port I/O in Pascal, and a procedure to compile for execution when an interrupt is received.

Multi-user systems featured at US trade show

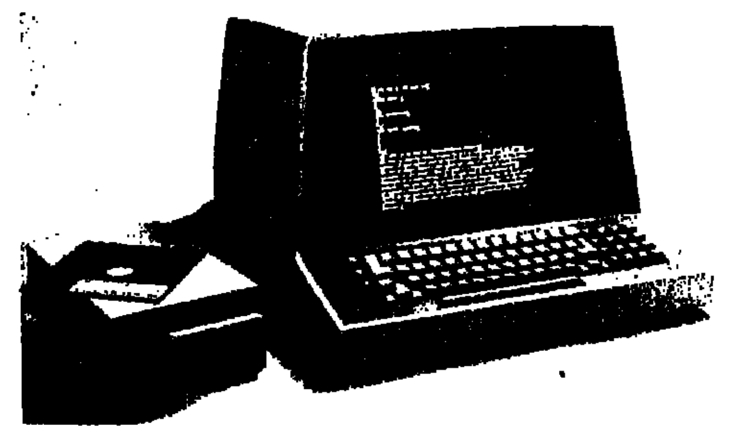
A WIDE spread of multi-user multiprocessor microcomputer systems was exhibited at Comdex, the US trade show aimed at OEMs, dealers and distributors. Delta Products had on display its implementation of Digital Research's CP/NET, four terminals each running CP/M.

All terminals interfaced to a hard disc, allowing shared access to files by passing requests to an MP/M processor. This method differs from the conventional way of developing operating systems to allow a single CPU to be shared as in Cromemco, Altos and Onyx equipment.

In Delta's method, each user is serviced by his own processor, with requests for shared resources such as disc files or printers being handled by a common processor.

Micromation had on display a system in which dumb terminals were serviced by several slave CPU boards. Both the Micromation and the Delta systems were based on 8-bit architectures.

Also at the exhibition were the first 16-bit multiprocessor configurations. Convergent Technology had on display a 16-bit system based on the 8086 from Intel, which served the individual user terminals. A separate Winchester disc was shared by all users. The company developed its own operating system and other utilities for the system.

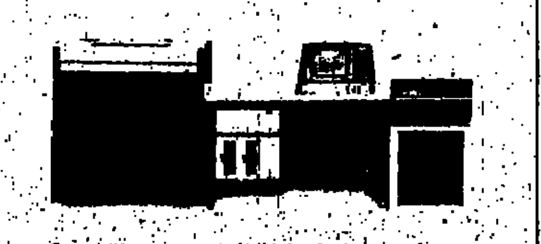


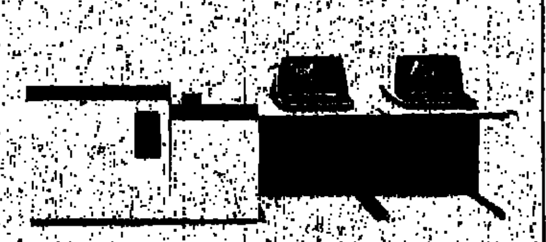
A NEW addition to the Vector Graphic range of microcomputers, VIP (Vector Intelligent Partner), is now available from Almarc Data Systems, the sole UK distributor, for about £2,125. VIP is based on the S100 bus and comprises a Z80A processor, 56K of dynamic RAM, a separate 315K byte floppy disc drive and runs the CP/M operating system.

Mostek tries 64K RAM

SAMPLES of Mostek's 64K dynamic RAM, the MK4164, are now available in limited quantities. The company says it has purposely delayed the release of the device in order to have a quality product that could become an industry standard in a similar way to the 16K dynamic RAM.

The 16-pin packaged device runs off a single 5V supply, has a 150 nanosecond access time with a 325 nanosecond cycle time, and a maximum power dissipation of 300 milliWatts active and 20 milliWatts standby. It features an internal refresh counter for automatic refreshing with pin one.



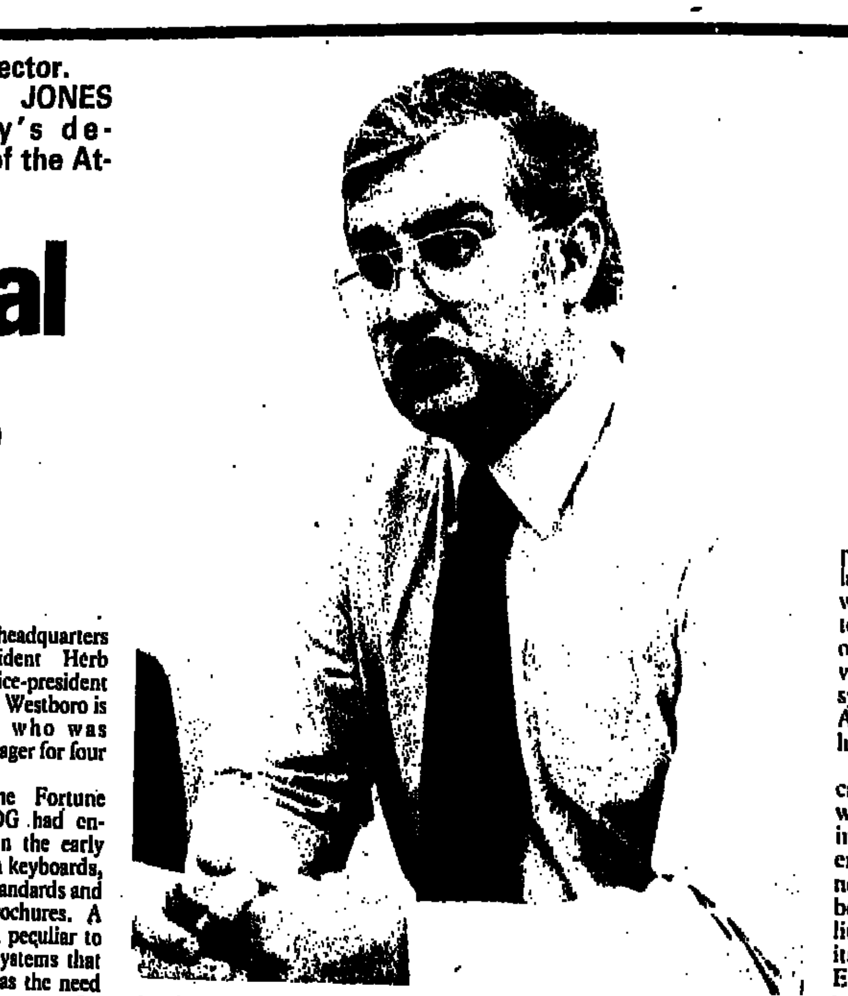


[illegible]

Ray Fortune is the first European to head the whole Data General operation in Europe as vice-president and general manager. His rise through the ranks included a spell as UK managing director.

He talked to KEITH JONES about the company's development on this side of the Atlantic.

How Data General sees its fortunes in Europe . . .



Ray Fortune (left) went back to school before taking up DG's top job in Europe – more precisely to the Harvard Business School. There he was subjected, with more than 100 senior managers from all over the world, to the Programme for Management Development, a Harvard course involving enormously complicated company case studies.

THE recession in Europe, as far as Data General is concerned, means that customers are taking longer to make decisions about buying kit, rather than not buying at all.

At the same time Data General's European general manager, Ray Fortune, was reluctant to forecast the company's European turnover this year with any precision, let alone whether it would achieve a growth rate similar to the impressive leap to $166 million made in the financial year ended September 30, 1980.

While expecting turnover this year to exceed $200 million, Fortune explained, "Our lead times are 90/120 days, far shorter than those for mainframe systems suppliers, so any big recession hits us quicker."

Having served as European sales director for more than three years before assuming the role of general manager, Fortune understands the nature of DG's total European market and the company's US business.

He pointed out, "In Europe Data General has a much higher percentage of small business customers than in the US. There is a lot more systems house business here and about 65% of turnover is from OEMs. But there are far fewer very large companies, universities, technical OEMs or central government customers in Europe."

According to Fortune, central government is the only market sector where DG has encountered nationalistic resistance to buying from a US based supplier.

"Maybe our people in France do not even try to sell to central government," Fortune commented, "but I know we have had some government sales in France and a lot more in West Germany and the UK. Outside central government I am not aware of any DG contract being affected by nationalism."

Asked if manufacturing in Europe might encourage more business on this side of the Atlantic, Fortune remarked, "We will not manufacture over here simply for political reasons. We are better having the least cost product by concentrating manufacturing in the US. In any case machines built, say, in the UK are not considered domestic in West Germany, France or Italy despite the EEC. Moreover, the value added in Europe to our kit is very high. We ourselves employ between 600 and 700 maintenance people and many of our customers, like Plessey, GEC and Quest in the UK, re-export our machines as part of their products."

Asked if there were any problems caused by DG in the US not understanding the European market Fortune pointed out, "We became a multinational only three years after our foundation and all international general managers for the last eight years have reported to the same man at headquarters – senior vice-president Herb Richman. And our vice-president of product planning at Westboro is Barry Fidelman, who was European general manager for four years."

At the same time Fortune acknowledged that DG had encountered problems in the early days, for example with keyboards, national engineering standards and the translation of brochures. A more critical problem, peculiar to the small interactive systems that are DG's speciality, was the need for interactive screen languages for non-English speakers.

Fortune remarked, "You cannot expect a small user South of Lyon to understand English."

As well as confining its manufacturing activities to the US and the Far East, Data General has also passed Europe over as a possible location for software development activities.

Asked why, Fortune explained, "The considerations are purely economic. The US is less expensive than Europe, particularly for hardware development. Two years ago we looked at the possibility of locating some software development in the UK but decided it will still be too expensive. But we have no policy against carrying out development work in Europe and we are looking at possibilities all the time."

On the marketing side, DG is already well established in Europe with 44 branch offices including 11 in the UK and Ireland, seven in West Germany, seven in France and six in Italy. The latest market to be attacked directly, rather than through distributors, is Spain where offices have been set up in Madrid and Barcelona.

Explaining why he had high hopes for Spain, Fortune pointed out, "The Spanish market is small business oriented and demographically similar to Italy which ranks in size with France and West Germany as far as DG is concerned."

Asked about DG's main competitors in Europe, Fortune commented, "We meet Digital Equipment everywhere in the technical market but never see them in the commercial sector. IBM is less strong than DEC in the technical area, but we always confront them when making a commercial sale. Siemens competes with some of our technical OEMs but is never encountered in the commercial sector.

"CII-HB is very strong in France and sells a lot of Level 6 machines to its mainframe base, but otherwise we do not normally meet them. With ICL we sometimes compete against the System Ten, depending on the country."

Competition from Japanese minicomputer suppliers is virtually zero in Europe, although Fortune pointed out that in Japan itself Data General now owned 50% of a joint venture company called Data General Nippon, the remainder of the firm being held by Japanese financial interests. It took over from the Nippon Minicomputer Company, a company which built DG machines under licence.

●

Meanwhile in Europe DG is expected to announce the first installations of its 32-bit MV/8000 within a few weeks, the first customer being in either Switzerland or the UK. In addition a 32-bit version of DG's AOS operating system totally compatible with the AOS used on DG's Eclipse family has now been announced.

The software for another significant DG product, the Xodiac network architecture announced in 1979, has been bought by several customers in Europe but no networks based on Xodiac have been implemented yet. Xodiac links have been established by DG itself between its operations in Europe and the US but the architecture has not even been fully implemented yet on the in-house network.

The Az-Text word processing package announced at the same time as Xodiac has created a lot of interest, but Fortune said that further developments in the office technology field would have to wait on the definition of standards. "We are not big enough to set standards ourselves," he commented.

Despite reports that DG is looking to make acquisitions of companies in areas like office systems, data communications and process control, Fortune said the company was not actively looking around in Europe.

He remarked, "Our growth will continue to be organic primarily."

Meanwhile, the UK continues to contribute the biggest single proportion of DG's turnover in Europe -- about 27%.

Small freight operators' fears on new air cargo system 'entirely false' – NDPS

SMALL freight forwarders and agents could be denied access to the ACP 80 air cargo system, alleges Dr Eric Haworth, director of Manchester-based Management Control Systems.

ACP 80 will replace the LACES (London Airport Cargo Electronic Processing System) used currently at both Heathrow and Gatwick.

Haworth's company is a DEC distributor specialising in freight transport applications and he made the claim after one of his clients received a letter from the NDPS, the commercial branch of British Telecom contracted to provide the computer.

The letter stated: "Consideration to the implementation of interface links for agent companies will not be considered until after October 1981."

Haworth's allegation was dismissed by Alan Saunders, chairman of the ACP 80 systems group, who pointed out: "The ACP 80 development is under the executive control of the ACP 80 steering body on which all sectors (freight forwarders, airlines and customs) are represented.

"It is incorrect therefore to attribute ACP 80 policy to NDPS, whose role is that of the main contractor for the ACP 80 bureau service."

An NDPS spokesman also responded to Haworth's charges. "The suggestion that ACP 80 facilities are being reserved for a privileged few is entirely false," he said.

"All companies have had an equal opportunity for access to the ACP 80 bureau system and everyone who has applied within 15 months of our being awarded the contract will be accommodated on the system in time for its October 1981 launch.

"Latecomers will be accommodated as soon as possible after that. About a quarter of intending users in the agent's community will share terminal equipment with other agents, an arrangement used widely in LACES for ten years," the spokesman added.

Meanwhile, Videcom has won an order worth £400,000 to supply NDPS with 205 terminals, a Videcom spokesman estimating that there will eventually be 425 terminals supporting ACP 80.

Videcom supplied replacement terminals for LACES and says that the new system "will provide several significant advances over its predecessor.

"It will handle exports as well as imports; sites removed from, as well as on, the airports; and it will provide online communications between terminal users, the ACP 80 bureau at Harmondsworth and various airline computers."

'250,000 desk-top computers by 1983'

OVER a quarter of a million desk-top computers will have been installed in the UK by 1983, according to a report compiled by US market researchers, International Data Corp. In the whole of Western Europe over 1.2 million units will have been installed by that time.

The report, Desk-top/Personal Computer Markets – Western Europe, estimates that between 1979 and 1983 the market will have an annual growth rate of 53%.

"The most important country markets will be in Germany and the UK, with the former taking 31% of the shipments and the UK 22%."

IDC emphasises that the term desk-top computer includes microprocessor-based systems in the price range £170 ($400) to £12,000 ($30,000), which have at least one high level language and facilities for peripheral attachments. The class does not include microcomputer boards or kits.

Some 62% of the total installations by 1983 will be in the business/professional sector which, according to the report, is growing at an average annual rate of 60%. Almost 750,000 units are likely to be installed by the end of 1983 with 30% in West Germany and 25% in the UK.

The home and hobbyist sector is growing comparatively slowly at an annual average rate of 35%. By 1983 IDC expects that over 100,000 Western European homes will have desk-top computers.

West Germany is likely to be the largest market for the home computer, taking 32% of the shipments during 1983. The UK and France will follow, taking 22% and 14% respectively. The low growth is attributed to the high prices in Europe compared with the US. IDC analysts feel, however, that prices will fall when Apple and Commodore start to manufacture in Europe.

In education, the annual growth rate will average a high 68%, which can be attributed to the heavy government funding in West Germany. Shipments will reach 47,500 by 1983.

The scientific market will grow at an average annual rate of 36% with nearly 250,000 units installed by the end of 1983.

Expansive mood

DATA processing company Interactive Data Systems, based in Milton Keynes, is expanding into new premises to increase production of S100 computer boards and the Saracen microcomputer range.

Exclusive top management group set up

JUST how far the implementation of the Office of the Future has progressed is the subject of an exclusive regular meeting of senior management services personnel, organised by Ron Yearsley of the BIS Group.

A group of about 30 will hold quarterly meetings at the Reform Club in London, to exchange current experience of the introduction of information technology in the office. The first will be on January 20.

The idea was the brainchild of the late William Mortby, former head of management services at Lloyd's of London, the underwriting corporation.

Among those attending will be David Eggleton, a deputy general manager of computing at BP and Dr Ian Macintosh, chairman of the consultancy of the same name.

Gearing up for new telecom era

THE Department of Industry's Consultative Committee on Telecommunications is to set up sub-committees. They will do preparatory work on standards and consider how radio communication might interwork with telecommunication after the enactment of the British Telecommunications Bill.

The decision was taken at the second meeting of the committee which was set up to provide the means for the government to consult the industry on the timetable for liberalisation of the telecommunications monopoly and other related issues.

Members include trades unions, manufacturers' associations, user associations, the British Standards Institution, the Central Computer and Telecommunications Agency and British Telecom. The Committee also welcomes views from outside those bodies.

Britain backs Artificial Intelligence unit

BRITISH research into Artificial Intelligence is "on the road again," following the establishment of a joint project by GEC and the Science Research Council into image analysis by expert system using an array processor.

That is the view of Donald Michie of Edinburgh University, whose team will be carrying out the work, finally pulling out of the doldrums in which, Michie considers, British AI has lain since the 1973 Lighthill Report.

The project (CW, December 11, 1980) will have support worth around £200,000 from the SRC and GEC and will look into two applications: analysis of signals from medical ultrasound machines and visual interpretation of engineering parts, enabling a robot to pick parts out of a bin.

"Using the Clip 4 array processor should provide increases of speed in this work of the order of 'tens of thousands,'" Michie said.

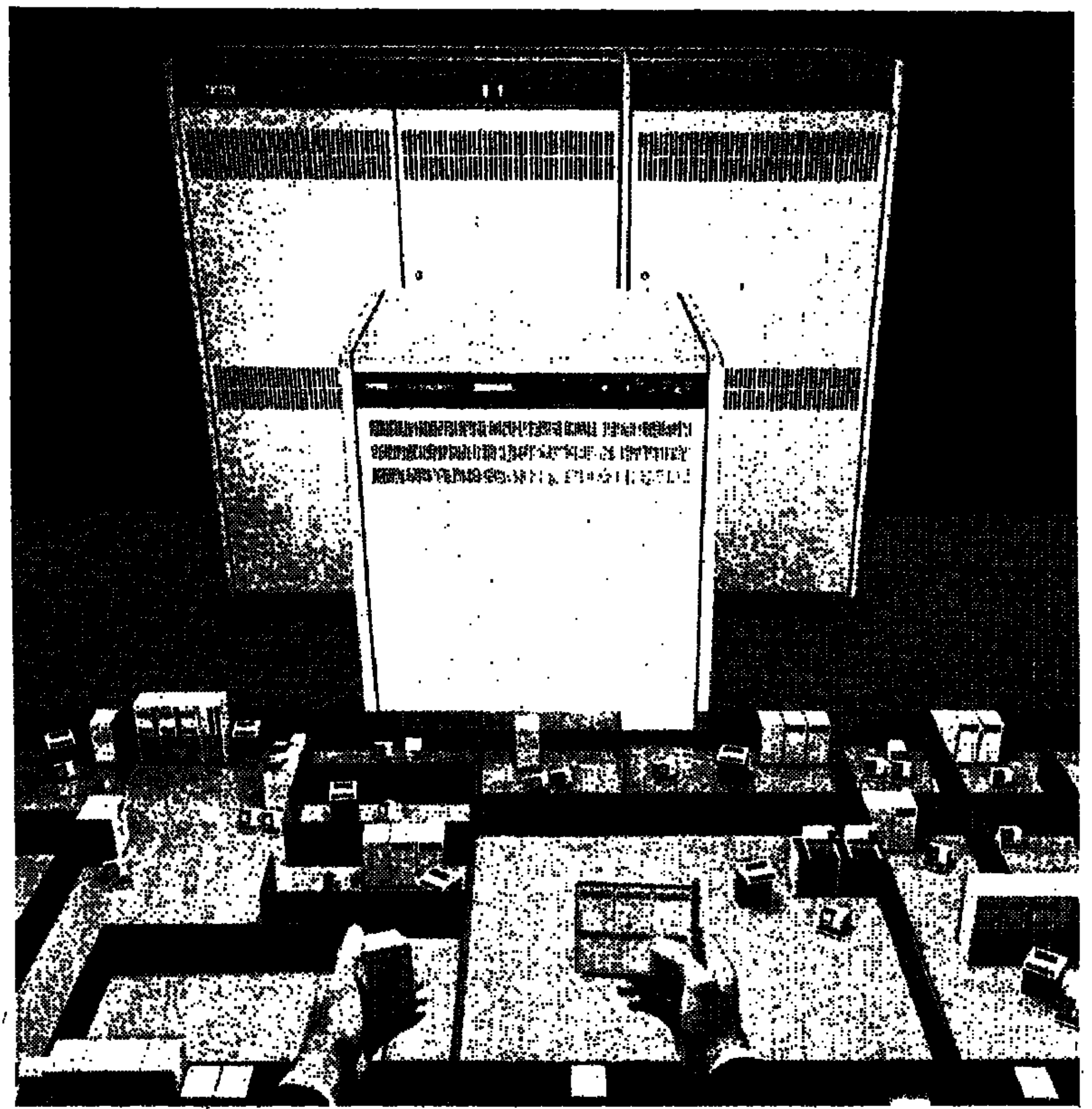
The array processor also makes programmable problems which would otherwise be too complex, Michie adds, enabling systems to be devised which "correspond to a human's way of thinking."

IBM is also increasingly interested in expert systems. A [illegible] dent of Michie's at Illinois University is working on an $80,000 project to develop an expert system for program debugging.

"IBM is "really tooling up for AI," Michie remarks, [illegible] the setting up of an Expert Systems Section at the Palo Alto (California) Technology Centre.

The SRC and GEC have not decided where their Clip 4 will be made but there is a proposal that Rutherford Laboratory should manufacture it, keeping it in stock for researchers.

هكذا من أجل



COMPANY NEWS

Telecom giant trims its sails

GOODWILL and inventory write-offs amounting to $220 million are to be taken by Northern Telecom in its 1980 financial figures as a result of major upheavals within Northern Telecom Systems Corp.

This is the computer division formed by the not-too-successful merger of the Canadian telecommunications giant's two major acquisitions in the computer field, Data 100 and Sycor. The UK arm of NTSC is still called Data 100.

Major problems within NTSC broke surface in the summer of last year when Northern Telecom admitted that it was likely to write off an estimated $95 million worth of goodwill held on its books since the two acquisitions in 1978 (CW, July 31, 1980).

Besides confirming the goodwill write-off, now estimated at $89 million, Northern Telecom has announced other write-off figures including a massive $113 million for inventories and other provisions.

They include $56 million for repurchase of mainly old Data 100 kit from third party leasing firms.

There is also a $31 million provision for restructuring future manufacturing and a $26 million write-off of inventories the company does not think it can sell over the next 12 months.

Northern Telecom has also announced a further 600 redundancies to be added to the 400 employees permanently laid off last September (CW, September 18, 1980).

The redundancies plus staff lost through attrition will reduce the total NTSC workforce worldwide to 4,200, compared with 6,500 two years ago.

As part of a grandiose plan to achieve a position of dominance in the office technology business, NTSC was merged with Northern Telecom's private digital telephone exchange business in 1979. The two operations were split again last year to enable the parent company to tackle NTSC's problems more effectively.

Apple sweet in Scotland

FORTUNES were made on the day Apple went to market (CW, Dec 25). Most of those fortunes were made in America by Americans, but one UK investment fund, Independent Investment Company of Edinburgh, made nearly £1.5 million.

The company acquired 150,000 Apple shares from sister company Atlantic Assets, which had bought the shares earlier in the year, probably through an option facility, for $4.12 each.

Directors of Independent Investment refused to disclose how the shares had been acquired other than to say that they had early notice of Apple prospects from contacts in America.

At a closing price of $26.50 on the day following issue each Independent share showed a profit of $22.38, a massive $3,357,000 profit on the whole purchase.

Back in the US, however, there are a number of clouds on Apple's horizons.

Massachusetts initially refused permission for individuals to deal in the stock. At the asking price of $22, the offer contravened a Massachusetts rule which says that the maximum asking price cannot be more than 20 times earnings. The Apple asking price was about 90 times earnings.

The ban has now been lifted in Massachusetts, but not in six other States which followed the lead set by the Boston security department.

These are Illinois, Texas, Wisconsin, Michigan, Alabama and Oklahoma whose continuing bans are having little effect as the shares rose to $38 this week.

Apple is still engaged in a legal scrap with two of the five original distributors, who have lodged claims for over $23 million alleging breaches of contract and other Apple misdemeanours.

Apple said in the prospectus launching the shares that, based on its experience to date, it did not expect the claims to have any "material" effect on performance or profits.

In addition, Apple has launched counter-claims against both distributors, High Technology Inc and Omega North West Inc, with an additional item claiming fraud against Omega.

In the same prospectus, Apple acknowledges that certain components may infringe existing patents. Again, Apple says that it expects to obtain necessary licences without any "material" adverse effect.

Ireland cuts corporation tax

IN a surprise New Year's Day announcement, the Irish government lowered the standard rate of corporation tax on all companies in the Republic to 10%.

The move came in response to pressure from the EEC Commission in Brussels, which objected to the tax-free regime offered previously by the Irish government to new manufacturing industry setting up operations in the country.

The tax holiday has been used extensively by the Irish Industrial Development Authority to lure foreign companies, particularly computer manufacturers, into setting up facilities in the Republic.

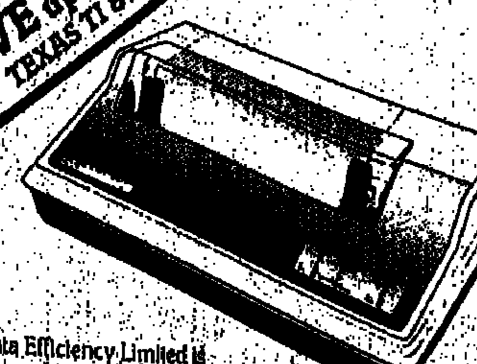
Apple, Beehive, Toshiba and Sord are among the companies which have responded to the generous tax incentives over the past year. In all, over 6,000 computer and electronic industry jobs were created in Ireland last year.

The IDA says that companies which started operations in Ireland under the original tax-free arrangements will not be affected by the new requirement until their existing arrangements expire.

The stance taken by the Irish government over the EEC Commission pressure is seen by many commentators as a deliberate snub to Brussels.

The original intention which underlay the Commission's action was to try and make the Irish Government come into line with the kind of incentives offered by other development authorities within the EEC, including those in the UK.

The Irish have also introduced a 100% first-year allowance on plant and equipment.



NEB sells off its stake in Case

THE NEB has sold off its 27.8 per cent stake in Case, the data communications equipment maker, for a profit of £1.8 million, or 138 per cent, in little over two years.

At the same time, Case itself has raised £2 million by issuing 371,000 new shares which were sold privately to institutional investors in London by brokers Cazenove.

Uses for the proceeds include paying off a £900,000 loan from the NEB, as well as increasing working capital.

The placement totalled £5.6 million in value, consisting of 641,600 ordinary shares at £6 and 225,200 convertible preference shares at £7.75.

A 21 per cent stake of the previous share capital was sold by Nick Samuel, son of the former chairman who represented bankers Hill Samuel on the board when Case was founded. Another 93,800 shares from smaller holdings were sold at the same time.

In making the placement, Case took advantage of a year of record growth chiefly based on sales of its new DCX series of data switching exchanges and its well-established MSX range of message switches. These are expected to take pre-tax profits to over £900,000 on sales over 60 per cent up from last year's £7.5 million.

Case says this growth takes it to No 1 in the UK data communications industry, and it now plans to seek entry to the unlisted securities market or a full Stock Exchange quotation "in due course".

This first sale of NEB-owned shares under the board's new chairman, Sir John King, is said to continue the government's policy of "transferring appropriate holdings to the private sector", now that Case is firmly profitable.

The proposed purchase of Case by Paradyne, a US company whose modems Case sells in the UK, fell through early last year when Paradyne's shares, some of which were to be offered to Case shareholders, increased dramatically in value.

Short-time work hits Texas Instruments

IN A carefully-timed announcement made after the New York Stock Exchange closed for the Christmas holidays, Texas Instruments announced a three-month work cutback for 17 per cent of its world-wide labour force.

This follows action taken earlier in the month when Texas placed 6,000 American workers on a compulsory two-week unpaid holiday. According to the company, this action was taken in response to market weaknesses and for the "convenience of the employees".

This cutback in work hours has reached the UK division of TI in the form of a reduced working week for about 20 per cent of the employees on the diode line at Plymouth. The workforce at the company's UK base in Bedford have not been affected so far, according to a Texas spokesman.

Texas Instruments' third quarter results announced before Christmas showed a turnover improvement of 26 per cent on the same quarter in 1979, profits improving by 21 per cent.

The respective figures were $1.024 billion for sales and $52.9 million for earnings.

At the time of the quarterly results announcement, Texas's chairman Mark Shepherd Jr., said: "We remain cautious about the near term, despite some indicators pointing to an ending of the US recession.

"The weakness in US capital spending, continued high inflation rates, a worsening European recession and the Japanese economic slowdown, could dampen economic activity well into 1981."

American commentators have been unable to establish which of the company's markets have been affected and Texas has been at pains to keep questioners at bay in the United States.

Gilt-edged technology

THE Stock Exchange and Bank of England have combined forces to develop a settlement system for use in the Gilts market, similar to the Talisman used to settle private share dealings.

It will be confined initially to institutions with Bank of England special Z accounts, will cover about 25% by volume of Gilts market transactions and will be run by a joint Bank of England-Stock Exchange committee with an initial £2.4 million budget.

Aregon 'in profit by 1982'

AREGON, which markets viewdata abroad and has recently been acquiring bureaux in the US, hopes to raise money from the private sector within the next few years.

The company, in which the National Enterprise Board has invested over £5 million and issued guarantees for a further £2.5 million, expects to make a profit by 1982, according to managing director John Pearce.

Following the receipt of the final £400,000 from the NEB the company's financial structure has been reorganised giving the existing executives about 14 per cent of the shares between them.

As a result of the reorganisation Aregon is seeking a non-executive chairman whose name is expected to be announced later this year.

Boom time for APL bureau

STSC, the specialist APL bureau and software operation, has announced turnover up 42%, to $13,137,000, for the six months ended November 30. Based in Maryland, STSC has offices in Europe and terminals in more than 300 cities. The improvement in turnover reflects a trend towards the use of bureau services in Europe and the US, by companies which have curbed capital expenditure during the recession.

Tandy sales up 13%

WITH November sales at its Radio Shack subsidiary up to $120 million, Tandy Corp reported consolidated sales 13% up on November last year, at $151 million. The figures show that the bulk of Tandy's business continues to be concentrated in the Radio Shack division. However growth in the Radio Shack shops was only 8% and the indicators are that Tandy is continuing to push its other interests where growth is twice that of the retail operation.

Dublin distributor

A NEW company has been started in Dublin to distribute Exxon word processing and information systems.

Sharptext, which will also handle Sharp copiers, has been set up at a cost of £250,000 and will employ 14, mainly sales and service personnel.

Profit up 33%

DATAPOINT, marketed in the UK by Ventek, has announced a 33% increase in profit for the first quarter of 1980/81. Citing an order book that was even stronger than the record bookings for the last quarter of 1979/80, Harold E. Kelley, chief executive at Datapoint noted a weakening in Datapoint's international business. Domestic business, however, continued to show strong growth.

CW SHARES TABLE

Date: 24/12/80
Date: 31/12/80

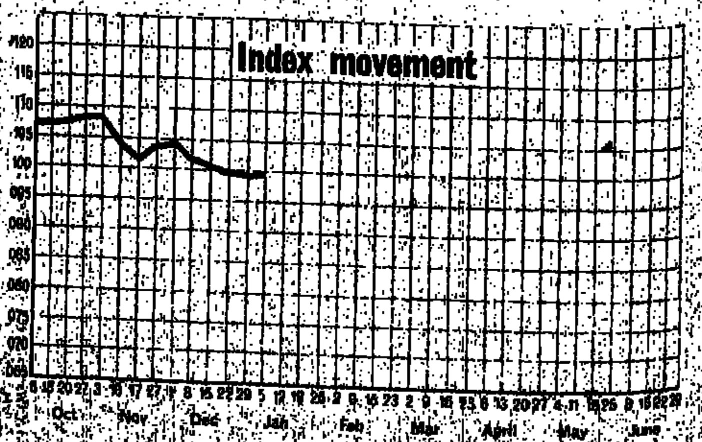
Index: 98.29 Change: −0.90
Index: 97.19 Change: +0.90

Pence 1980 High	Pence 1980 Low	London Stock Exchange Stock	Pence Price	Pence C'nge
172	73	A Comp Tech (25p)	142	−1
104	66	BOC Int (25p)	104	+ 6
43	21½	B Bov Kent (25p)	21½	− ¼
120	70	Chubb (20p)	80	+ 4
100	44	Cole (R.H.) (25p)	56	+ 1
875	540	De La Rue (25p)	792	+2
188	148	Extel (25p)	188	+ 4
490	234	Ferranti (50p)	467	− 16
606	338	GEC (25p)	606	+15
191	69	ICL (25p)	69	− 5
86	64	Kalamazoo (10p)	80	− 1
345	203	Kode Int (25p)	278	+ 8
270	80	Muirhead (25p)	80	− 6
367	231	Office & Elect (25p)	334	−
470	291	Philips Lamp (Fl 10)	291	− 6
275	108	Plessey (50p)	269	− 1
167	78½	Quest Auto (10p)	152	+ 4
388	109	Racal Elect (25p)	328	− 2
111	65	Rediffusion (25p)	111	+ 1
374	267	Thorn-EMI (25p)	342	+ 7

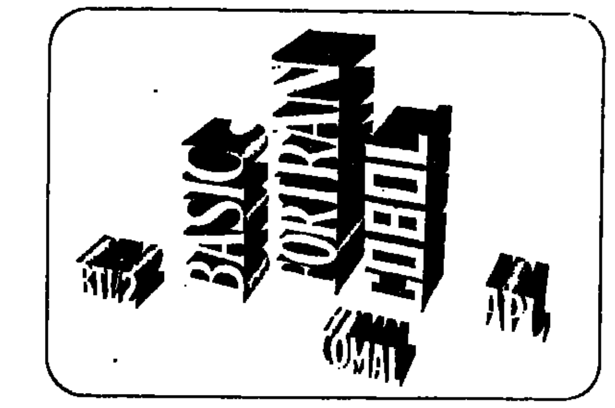
$ 1980 High	$ 1980 Low	US Stocks Stock	$ Price	$ C'nge
36⅝	15⅛	Amdahl	30⅛	+ 1⅜
35¾	17⅝	Ampex	35⅝	+ 3⅜
51	33¾	Auto Data Pro	48¼	+ 3⅜
84	48⅝	Burroughs	64⅛	+ ½
		Comp Automation		
29½	16⅝	Comp Sciences	18⅝	− ⅛

$ 1980 High	$ 1980 Low	US Stocks Stock	$ Price	$ C'nge
21½	11¼	Comshare	17¼	+ ½
75½	46	Control Data	72¾	+ 1⅜
86¾	53⅛	Data General	68½	− 1⅛
117	44⅛	Datapoint	117	+ 8
38	10⅞	Dataproducts	36⅛	+ 2⅜
99⅛	68½	Digital Equipment	84⅝	+ 6¼
37⅛	18¾	Elec Data Sys	37⅜	+ 2⅛
18⅞	6¾	Gen Automation	10½	+ 1⅞
56⅛	29¾	Harris	52⅛	+ ¾
86⅝	63¾	Hewlett-Packard	88⅝	− 2⅛
112	66¼	Honeywell	112	+ 6⅜
49	27⅛	Intel	40¼	− ⅜
72⅛	53⅛	IBM	68¾	− 4⅛
29⅞	10⅛	MDS (Mohawk Data)	22⅛	− ⅛
24½	9⅛	Mngmnt Assist	14⅛	− ⅛
18⅞	11½	Memorex	12½	+ ⅜
31⅛	23	Modular Comp	23⅜	+ ⅜
83½	42¼	Motorola	71⅞	+ 1⅛
50	17¼	National Semi	41	+ ⅜
78⅛	53¼	NCR	75	+ 1⅜
69½	37	Perkin-Elmer	65¾	+ 4⅜
40	10	Prime	38⅞	+ 4½
110⅝	63¼	Raytheon	108½	+ 2⅛
51⅜	47⅛	Sperry Corp	61⅜	+ 4⅛
28¾	11⅞	Storage Tech	23	+ 1⅜
101¼	28⅜	Tandy	96¾	+ 6⅜
121⅜	69⅝	Texas Instruments	121⅜	+ 1⅛
47⅛	18⅞	Tymshare	47⅜	+ 3½
44	6⅜	Wang Lab B	40¾	+ 4
19⅛	8¾	Wyly	18¾	+ 2⅛

The table shows the closing prices in London on Wednesday and in America on Tuesday. The share index is based on the prices of the UK companies in the table. Highs and Lows have been adjusted where necessary.



SOFTWARE FILE



MINORITY LANGUAGES

APL puts personal computing power in users' hands

by Valerie Lusmore

APL has variously been described as an addiction, a lot of funny symbols, mainly for scientists and engineers, not suitable for commercial programs, the answer to all computing problems, and "absolutely fascinating, but don't tell me about it, or I might get hooked".

This last is a common reaction among my more conventionally employed friends and relations in the DP world, and they may have a point. People either love APL or they hate it.

Such violent reactions hardly seem appropriate to a mere programming language, but it is noticeable that most of the people who get to know APL have their working lives changed in some way.

Some of these changes are dramatic switches of career path: from accounting or teaching into systems work; from programming into financial analysis; for some, mundane clerical work has given way to the responsibilities of a database steward, swiftly becoming proficient at producing his or her own report programs.

More so than in traditional DP environments, there is more opportunity for those usually kept at the bottom end of the hierarchical ladder. Data prep girls become adept not only at entering the data but at retrieving it and understanding its implications — more like data analysts.

For APL is not just for programmers — it puts personal computing power in the hands of the person with the problem. Many of its users have no formal computer training, but are quite happy to use a good tool to solve their own problems quickly and efficiently.

In the past couple of years many have started to learn APL, and many very large systems have been developed using it. Often users have been sold APL as an extra goodie together with a new large mainframe, and are hard to convince of the benefits of change.

Pays dividends

What makes learning APL hardest is that it is not like any other language. Certainly one can write Fortran-like or Basic-like APL, but in order to gain much benefit you have to forget your old techniques and your knowledge of how computers work.

It's a whole new way of thinking, and it's much easier to learn if you have no preconceptions. But it quickly pays dividends and, even when you are new to it, programmer productivity is about 10 times that of other languages.

Of course there are pitfalls for the unwary. Traditional DP management techniques for controlling specifications, projects, standards and documentation do not translate well into APL use. They have to be re-thought.

Especially at first, many systems are analysed, programmed and implemented by one person, often without any reference to the DP department, and it is not realised that problems will tend to occur about a year later.

Often, APL may be the first experience the operations staff have of time sharing with its changed expectations and changed user priorities. This is a big change, and because the users are relatively quiet it is not realised how productive they may be.

All this could be a recipe for chaos. But never fear, it is not as bad as this in most cases — just an acceleration of the trend for computers to become more of an everyday thing affecting everyone's lives.

APL is so easy to learn. Within an hour of first trying it, useful answers are coming out, and it is easy to use your knowledge of your own subjects to formulate APL functions in that discipline. It is a language for building languages.

Never bored

My own introduction to APL was quite typical. After some years as a programmer/analyst at a bureau, I arrived in Toronto, in search of a new job, determined never to write another program. It was so boring — the only possible interest was in searching out bugs, and there weren't many of those. So it was time for a change.

Among the prospective employers I interviewed (they thought they were interviewing me) the most interesting was Ian Sharp, managing director of I. P. Sharp Associates, which was looking for a two-person support team for its APL time sharing service. I. P. Sharp had recently implemented APL for IBM, and running a service seemed the best way of ensuring that it was available for their other development work.

That was in 1971, and I've never looked back. Nor have I been bored since then! It took a few weeks to learn APL, and it was not until several months had passed that I realised my whole way of thinking had been changed — not to suit the language, but in terms of whatever problem I had been tackling (and incidentally there has never been a problem that has been too difficult to tackle in APL).

I didn't have to worry about the computer or the language any more, just the problem. This freedom from limitations is one of the main reasons why people like APL.

Novices don't know what it is they don't know, so they can't ask questions — and even when you have written your first program, it generally has to be compiled and have lots of mysterious Job Control statements added before it is even tried. So you have to learn a lot before you can even do trivial things.

Being interactive, APL solves a lot of those problems for you. You don't worry how the system copes with storing a string of 15 numbers; you just put them in. Because APL works on matrices in exactly the same way as single numbers, the complications of looping, which obscure what the problem is about, are not needed most of the time.

It is easy to see how a statement will behave because of the absolute consistency of the syntax, and the lack of a hierarchy of operations.

The system copes as efficiently as possible with the storage of data and there are no restrictions or naming conventions for data or programs.

The other well-known advantage is the rich set of symbols.

Learning APL has many analogies with learning a natural language: you only need a smattering to use it (just as a toddler does) and you learn more as you need it.

There are many ways of describing a particular concept and this allows you to use what you know to make yourself understood. Formal grammar comes naturally with use.

Ken Iverson, who first defined APL in the late 50s, describes it as the only computer language to have been 200 years in the development, as it is a consistent notation for writing down algorithms, the building blocks of mathematics.

In the UK, APL has been available since early 1973, and it is surprising how its use has grown. The first tentative links to computers in North America have become world-wide networks.

Over the last three years, nearly all major UK companies have started using APL. The UK APL User Group is flourishing, and a real community is growing up. This is very important to the continuing use of APL. In the days when nearly all users were on a limited number of time sharing networks, it was easy to get assistance, knowledge was easily disseminated, and informal support networks aided newcomers.

Now users on in-house machines need the User Group to provide that link, and with the increasing availability of APL on micros, more people want to know these things.

Luckily there is, so far, a high degree of consistency among all implementations (an APL standard is two or three years down the pipeline) because the implementors hold regular conferences to discuss extensions. Ken Iverson and the original developers of APL are all still deeply involved.

If you have got this far and are still wondering whether to try it, remember two things. Those of us in the APL world will never be able to apply for jobs with "Two years' Cobol", but APL is growing all the time; and there is plenty of work — we could do with more bright people urgently.

A new generation of languages has grown up to serve the various fields in which computers have found a role.

Software File is sampling a few of these "minority languages" and handing over to specialists to explain how they can be of particular value to both programmer and end user.

Here the interactive programming language APL is described by Valerie Lusmore, whose first contact with APL came when she was working for its developers, I. P. Sharp.

Her career with the company in Toronto and London lasted from 1971 until 1978, and for the past two years she has operated as a freelance APL consultant in the UK.

She was a founder member of the UK APL User Group.

OP SPOT

by Paul Fisher

The ops manager who prefers to take on school-leavers

OPERATORS: David Carr (seated) and Peter Alton in the machine room where "every single box is IBM". Carr joined straight from school and it was the first job he went for. He's happy as an op and says he's not interested in programming. Alton, who was trained before he arrived at the site, also plans to stay in ops because "it gives a better chance of getting into management."

PLENTY of people, both in politics and business, are ready to pay lip service to the idea of employing school-leavers. But very few have a job for them.

This is not the case, however, at the Royal London Mutual Insurance Society in Colchester, where the manager of computer operations, Graham Lund, says: "I would prefer to take school-leavers." It isn't all done in a spirit of unbridled altruism, because he adds: "If you get them young, you can mould them."

What Lund looks for in a school-leaver is evidence of an active temperament, and he thinks enthusiasm for sport is a good guide.

"Ops," says Lund, "are doers rather than thinkers, although this doesn't mean they can't think." He uses the IBM programmer's aptitude test and finds that, in academic qualifications, CSEs are acceptable.

Lund encourages school parties to visit the installation. "I'm appalled," he says, "at some of the educational establishments I've seen. It seems to be the thickos in the lower bands who are given computer studies."

Responsibility

He would not contend that the education system should churn out purpose-built employees because ultimately "it's the company's responsibility to train, for it is the company that benefits."

"I'm training for my organisation," says Lund, "and I don't believe you can generalise on standards. What is good for one company is not good for another."

The Royal London ops department has never used a TOPs graduate.

The first three to four months a trainee spends with the Royal London are devoted to an appreciation of what goes on at the site. They start in a bits and bytesy way learning system fundamentals, and visit control and data prep areas. This is followed by equipment training with days on the printer and card reader.

Parallel

Recruits are then sent on an Infotech basic operator training course because, says Lund: 'Infotech courses are good, and I believe in sending people away to mix with others at their own level."

THE OPS MANAGER: Graham Lund has been with the company for nine years – which is longer than he expected on joining as a shift leader. An advocate of a well-defined career path, his belief in operations has taken him to a five-figure annual salary.

He wishes that IBM would run a worthwhile course for trainees, but doesn't see why individual companies should be shy of conducting their own in-house training, especially at a higher level.

In-house training runs in two parallel ways. Trainees are assigned to a shift supervisor and the idea is that they should meet for half-an-hour a day to discuss CPU, JCL, how to alter power cues, and so on. More formal are the in-house courses such as that on JCL being given by Peter Sayward.

Lund advocates well-defined career structures and on being appointed operations manager he increased the number of levels to make a promotion path within his department. There are seven grades of op on the site, including the manager.

Desk job

At the bottom of the pecking order the trainees – or junior operators as they are called – start on £3,400 and are put on £4,000 when they qualify some nine months later. The maximum for an op, including shifts, is £6,000.

Lund believes in a distanced style of management and that it is not his job to be a jumped-up button pusher.

"Too many ops managers," he says, "want to get their hands dirty. Although they should have an ops background their job is behind a desk directing and forward planning."

Warming to the theme, he continues: "Ops managers aren't super operators; it is their job to manage staff. I rely on my management team."

That team is Mike Stinchcombe, assistant manager; Paul Sharp, the ops supervisor who is responsible for day-to-day running of the centre; Kevin Crouch, support group supervisor who has 18 months as an IBM engineer as part of his CV; Mrs Lesley Mayhew in charge of data prep. Fully staffed, the operations group has 58 people.

The operators work a two-shift system from 8 am to 3.45 pm or from 3.25 pm to 11 pm which links in with the clerical hours of the company. Any overtime is for development work.

The Royal London has been committed to computers since the early Sixties when it installed one of the first 1401s. A measure of its commitment is that during a recent moratorium on recruitment, the computer department was exempted.

Shift system

Another indicator is that the DPM is an assistant general manager of the company as a whole.

At present the site has a 4-megabyte IBM 4341 running under DOS/VSE Release II with Power VS. An additional 4341 will be delivered by August 1981 to cope with the extra burden of putting 6,000 employees on payroll. Teleprocessing work is kept to a minimum and although there is a long term commitment there is only one link with the central office in London for actuarial work.

OPERATIONS SUPPORT GROUP ASSISTANT: Peter Sayward had a six-month spell as a printing apprentice before he joined the Royal London. During his seven years there he has worked as an operator and now, as part of his job in the support group, he is preparing JCL teaching material.

Courses aimed at all levels

INFOTECH Operations has a programme of 21 separate courses scheduled for the next six months. Ranging from computer systems fundamentals to various advanced operations techniques, the courses are pitched at all levels of skill and experience.

Infotech is sticking to its policy of allocating people to courses according to their job function rather than job title. Six areas have been defined, and these are ops supervisory/management, ops support, networking, data control, data prep, and operations.

Changes include upgrades of IBM DOS/VS and DOS/VSE and a broader based data communications course for experienced ops and network controllers.

One of Infotech's newer lecturers, Ian Stinson, chairman of the VM users' group, will give a course on VM, CMS operations techniques. Emphasis will be on the use of CMS and the course will cover Release IV.

A new course, Data Preparation Control and Supervision, will examine documenting, work scheduling and filing.

There are also three management forums in February, April and June. The first, Software and the Operator, will review developments in software controlled operator packages. The second hacks away at a familiar theme and is called Operations – the Poor Relation?

For those who think mainframes might shrink, the June forum is called Minis and Micros – the New Operators.

PROGRAMMERS' PAGE

by Pamela Rowe

Beware of Basic when badly taught

SOMETIMES it is harder to teach someone who has half an idea than the person who knows nothing at all.

Dr Roger Oakley, a teacher of computer programming at the De Havilland College, in Hertfordshire, certainly feels this about his students who as prospective programmers have trained themselves in Basic from do-it-yourself books and manuals.

He condemns the current widespread and almost indiscriminate use of Basic in education as having a damaging effect on professional programming standards.

"Basic has become the language of the microcomputer," he says, but goes on to question how it is taught, when it is taught, by whom, to whom, and why?

It was not always such a popular language. Before the advent of micros it was used mainly by scientists and engineers who appreciated its simplicity and the lack of need for extensive training. Run times, though, were long, and computer time expensive, so professionals tended to write in other, pre-Basic, languages.

Ideal tool

When the chip boom came and TV games, calculators and personal computers mushroomed in every shopping precinct, Basic really took off. As an off-the-shelf interactive language, easily learned by the layman, it was ideally suited to the new technology that made computer time cheap and available, and brought it down to street level.

Last things first – why is Basic taught, and by whom?

Dr Oakley: Computer education is now recognised as an important part of the secondary school curriculum and the traditional view has always been that it is through actually programming a computer that the student will realise two fundamental things: One, that computers are essentially stupid and need things spelt out simply and completely before they can do anything properly; and two, that computers work under the control of people – even a schoolchild can exercise that control once he or she has learnt an appropriate programming language.

Basic provides an ideal tool in both respects, but there is another, less defensible reason for its adoption. The average school has no-one with any real expertise or experience in computing or data processing, so when it acquires a micro, a maths or physics teacher who "did a bit of Fortran at college" becomes the computer studies tutor. He teaches himself Basic one step ahead of the class, and the course is under way. Bad programming habits once learned are not discarded, and many potentially good programmers have been spoiled in this way.

When is it taught?

Dr O.: The most frequent encounter with Basic comes for schoolchildren at the age of 13 or 14, when they are introduced to programming as part of a CSE or O-level course. Many others meet Basic for the first time in their maths lessons because their teacher is trying to generate some interest in the classroom.

For the pupil who is not going to become a computer professional it does not matter too much, but the prospective programmer or analyst should not start with the idea that "computers think in Basic" or "computers do maths".

To whom is Basic taught?

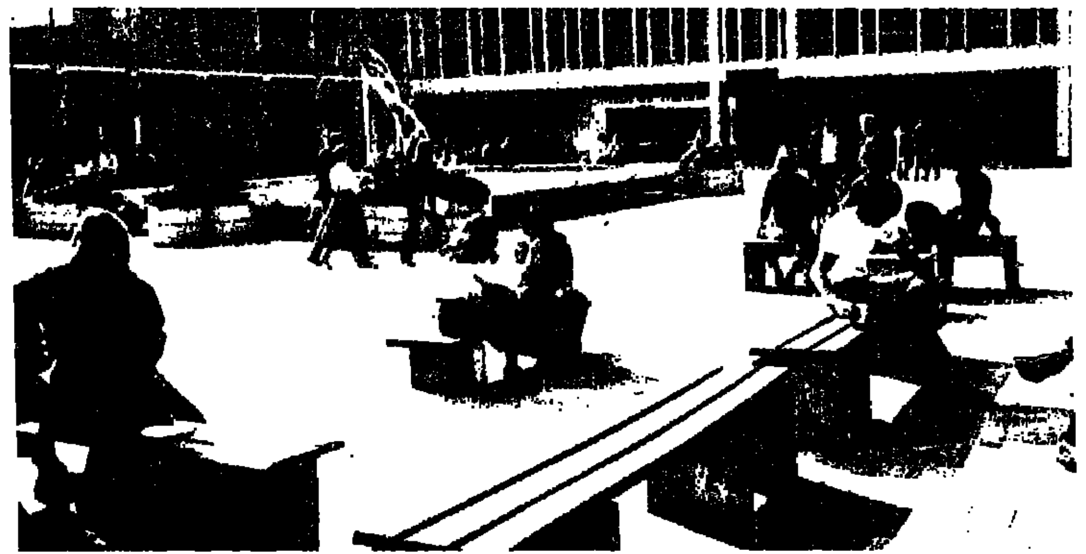
Dr O.: At present, getting on for half our young people have learned some Basic by the time they leave school, and this will increase as facilities for practical work improve. At the moment, opportunities for computer education depend as much on the particular facilities at a school as on the ability and interests of the pupil.

How is it taught?

Dr O.: In a word – badly. I doubt if there is any completely satisfactory solution to the Basic problem but two steps in the right direction would be:

Firstly, to set up a national policy on computer education in schools, with comprehensive training for teachers. Teacher salaries are too low to tempt enough well-qualified people from the computer industry, so we have to be prepared to retrain teachers of maths and other disciplines. These courses must include commercial computing and data processing as well as computer science.

Secondly, Basic should not be taught as the first or only programming language to any student, and particularly not to potential programmers. An introduction to the art of programming via a simple machine code and assembly language, to establish fundamental programming concepts, would start all students off in the right direction. This would give them an awareness of function codes, binary addresses, registers and store locations, which must help any programmer to do his job better, and provide a valuable introduction to subsequent high-level languages. Even non-vocational students would benefit if their knowledge of programming had more depth and variety than Basic alone can offer.



Students at Essex University contemplate the academic life, recently enhanced by the opening of a new microcomputing laboratory to handle 300 undergraduates a year.

Graphic approach to learning

LEARN programming with a graphic or two. The Computer Science Department of Essex University at Colchester has long believed in their effective use during the early stages of learning, and has chosen to equip its new Micro Teaching Lab with 17 of the Vector Graphic System B units operating under UCSD Pascal.

"They were chosen," said Iain MacCallam, director of the department, "because of their inherent reliability and high standard of construction and value of money."

Three hundred undergraduates a year will be able to use the new lab which will complement the University's main DEC 10/90 computer service, and provide Essex with top-notch facilities for teaching programming.

Open University micro course aims at industry

TALKING of new ventures for the New Year, the Open University has recently advertised a course on microprocessors in industry.

In full it is Microprocessors and Product Development: A Course for Industry, designed to show how incorporating a microprocessor affects product development. It is aimed particularly at executives who have to make decisions about new products investment and managers involved in financial administrative affairs, but is of interest to all technical staff.

The course is divided into theoretical and practical components and dangles the carrot of your own home microprocessor system – the Intel 8049, accompanied by an Experiment Book.

This describes program entry into the system by three methods: using binary codes; denary codes; and elementary assembly language. The programming emphasis is more on what is involved than how to write, and the whole book takes roughly 16 hours of work.

Written matter consists of six study books starting with an introduction to microprocessors, the choice between them and basic features, it continues with issues of design and development and leads finally to discussing ramifications of microprocessor inclusion into the product.

Each study book is scheduled for about eight hours of study, making a total of 60 to 70 hours for someone without previous knowledge, though the course can be spread over as long or short a time as desired. It can be started at any time and the fully inclusive course fee is £15.

Enquiries and applications to the Microprocessor Project Office, PO Box 188, Milton Keynes MK3 6HW.

Puzzler

TWO platelayers on their way home from work decide to take a short-cut through a single-track railway tunnel. Just as they reach a point three-fifths of the way through the tunnel, they hear a train coming towards them. One man runs towards the train, and just gets out of the tunnel in time. The second man runs back along the tunnel, at the same speed as his colleague, and he also just gets out in time.

If the train was travelling at a constant speed of 50 mph, how fast did the men run?

See page 37 for solution.

PEOPLE and EVENTS

Top management changes at Honeywell

Keen

AFTER 19 years with Honeywell Information Systems, the company's director of communications Alan Keen has retired.

Keen's responsibilities have been in advertising and publicity, both in Europe and the UK. He was behind the mid-Sixties "animals" advertising campaign, featuring "animals" constructed with electronic components. He was also involved in publicising the Emett computer.

Retirement from the Middlesex offices will give Keen the chance to pursue his hobbies of gardening and photography.

Also at the company's Brentford headquarters, Ralph Forster has been appointed director of finance and administration. He joined the company in 1973, and since 1978 has served as controller of marketing. He is replacing Bob Mall who will take over as finance director of financial planning and analysis at Honeywell's systems management office in Minneapolis.

Jim Mitchell has been appointed principal consultant in charge of Geisco's Aberdeen office. He joined the company in 1975.

Geoffrey England has left his post as principal consultant with Logica, to take up the job of sales manager at API. Plus.

David Morley has been appointed product manager, small business systems, at Baric Computing Services, where he has worked for 18 months.

George Lowrie, who joined ITS/SITA in Frankfurt in 1973, has been appointed commercial manager of the ITS (UK) in Hounslow.

General manager for EDS

EDS World Corporation UK has appointed Harry Richardson general manager. He has been with the company since 1978, and was involved in setting up EDS UK as a supplier of facilities management, consultancy and data processing services to UK clients. He also co-ordinated an analysis of the UK and European markets for EDS products and services in the company's traditional areas of business.

Richardson's involvement in computing began in the Sixties, in merchant banking. Following four years with Beechams, in data processing operation, he spent over eight years in the computer services industry, in insurance, Lloyd's underwriting and banking.

Michelson award winner

THE A. A. Michelson award for 1980 has been presented to David Schumacher of the Institute of Software Engineering, for advancing the state of the art in computer system measurement, in particular for his creation of standards for performance reporting and his educational activities in the subject area.

The award is made in the US by the Computer Measurement Group, and other professional bodies, including ACM Sigmetrics. Although it is nominally an annual award, there have only been five winners in the last decade, as recognition is given only when there is a unanimously accepted nominee.

Brian Hollewell has been appointed Northern area sales manager for Olivetti Computers. He joins the company from IBM's DP division, where he had worked in a number of sales positions since 1976.

John McGregor-Temple has been promoted by Redifon Computers to manager, field software engineering operations. He joined the company in 1973 and served most recently as national support manager for the UK.

David Spurr is Computer Machinery Company's new purchasing manager. He was formerly materials manager with Honeywell Information Systems.

Bill Goates has been appointed head of the applied systems division of CTL. He was formerly general manager of Telcordering Ltd, a company within the Software Sciences group.

Peter Samson has joined Peter Merrick Associates as sales manager for Time Slot. He was previously manager of the accounting services department of a large bureau. Also joining the company is **Linda Taaffe**, who becomes customer service co-ordinator for Time Slot.

Nexos names director

Frank McGovern has been appointed director of supply at Nexos Office Systems; **Barry Marshall-Johnson** joins as Southern regional manager. McGovern has had 16 years' experience in the computer industry, several of which were spent with Plessey. Immediately before joining Nexos he worked for Philips. Marshall-Johnson joins the company from IBM where he worked for seven years as systems salesman in the data processing division.

Mike Thorne has joined Inbucon Management Consultants to head the company's DP appointments and contract personnel services. He was formerly managing director of Thorbar Recruitment and Consultancy Services.

Tony Martin has been appointed technical support manager at Timeplex Inc. He joins the company after five years as product marketing executive with Racal-Milgo.

Richard Spangler has been appointed vice-president of European operations at International Computer Programs Inc. He joined the company in 1976, serving as vice-president for marketing and sales for the US sales operation. He is now based in Park Lane, London.

Keith Larder has been appointed divisional director C&I/MEG at NCR. He joined the company in 1966 and held various sales positions, serving most recently as area manager, C&I North.

John Myers has been elected vice-president of the Harris Corp in Melbourne, Florida. He was formerly with the Farinon Corp.

Ayon Cinnamond has been appointed advertising and press relations manager for Business Computers (Systems) Ltd. He was previously with Singer Business Machines.

Carbery

McGinlay

Dataproducts promotions

TWO Dataproducts (Dublin) personnel have been promoted. Maurice Carbery who has been with the company for 13 years, becomes director of the supplies division. He spent 10 years in engineering, followed by three years in product marketing. Jim McGinlay has been promoted to European marketing manager, supplies division. He joined the division when it opened four years ago. Prior to joining Dataproducts he was London area salesman with Dataset, then an ICL subsidiary.

Michael Rooms and **Nigel Wood** have been appointed sales executives at Data Logic's word processing division. Wood was formerly management executive with Marks and Spencer, and Rooms joins from Rank Xerox.

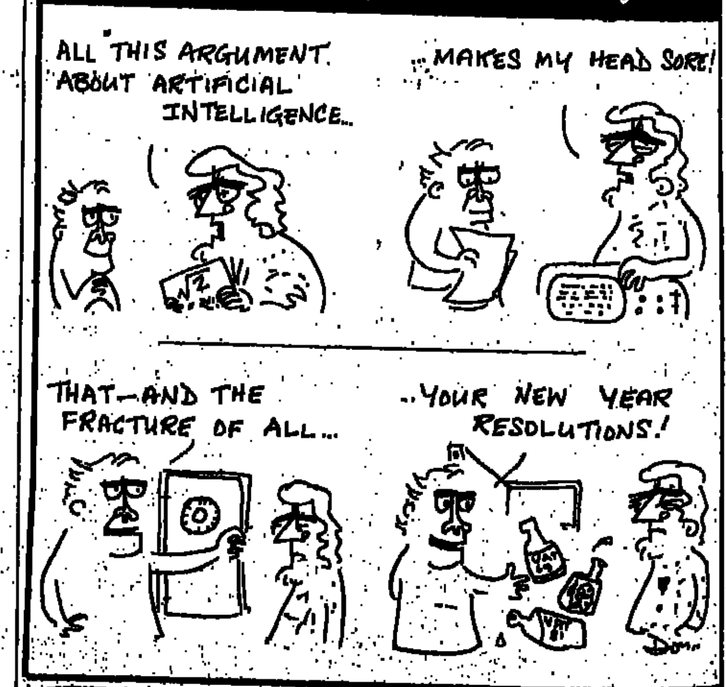
Geoff Theakston has joined Consolidated Data Products as sales director. He is director and general manager of Centronics.

David Morley has been appointed product manager, small business systems at Baric Computer Services. He has been with the company for 18 months, working as senior marketing consultant.

John Daniel is sales and marketing director at Burndept Electronics. He joins the company from Cambridge Scientific Instruments where he was marketing director.

Liveware File

by Don



DIARY

JANUARY 13

Protection For Software. BCS Merseyside branch, Faculty of Science Lecture Theatre, Liverpool University. 6.00.

The Local Computer Scene, Past, Present and Future. IDPM Hull branch. Hull Crest Hotel, Ferriby High Road, North Ferriby, North Humberside. 7.15.

Artificial Intelligence — Voice Recognition. IDPM Essex branch. County Hotel, Chelmsford. 8.00.

Meeting. IDPM Scottish branch. Speaker from CBI. Glasgow.

JANUARY 15

Meeting. IBM Guide Set Group. IBM Basinghall Street, London EC1. Details: (01) 828-8104.

JANUARY 20

Communications in principle — the theory of communications and networks. IDPM W. London Oxford branch. Caversham Bridge Hotel, Reading. 7.30.

Microcomputer workshop. IDPM Scottish branch. Edinburgh. Ticket holders only.

JANUARY 21

DP remuneration and job satisfaction. IDPM Central London Branch. Pearl and Dean Studio, 15 Broadwick Street, London W1. 6.00.

DATA ANALYSIS

Special cases of entity sub-types

Section I — Part 13

of our series describing a system design methodology

by Rosemary Rock-Evans

IN Part 12, the concept of entity sub-types was introduced. Entity sub-types were defined as mutually exclusive groups of entities within the one entity type. They were shown to be important for database design and program and system design. Some general guidelines were provided for determining entity sub-types, by studying the events which affected the entity type and the stable classifications of the entity type.

In this article special cases of entity sub-types are considered which can be deduced from the entity model and the results of functional decomposition.

Inclusive One to Many relationship types

Inclusive relationship type describes the situation where one or more relationships cannot exist unless one particular relationship exists. An example is shown in Figure 1, where a patient cannot have attended an Appointment unless it has previously been made.

Where an inclusive one to many relationship type exists, the procedure is to *replace* it by a bivalued attribute type. The attribute type is allocated to the entity type on the "many" side of the relationship type.

In the example in Figure 1, the inclusive relationship type "attends" has been replaced by the attribute type "Appointments Attended?" with the two values Yes (Appointment was kept) and No (Appointment was broken).

This is effectively creating entity sub-types of "Appointments which were Kept" and "Appointments which were Broken" resulting from the events "Person attends for Appointment" and "Person does not attend for Appointment."

Inclusive Many to Many relationship types

Where one or more inclusive many to many relationship types exist between two entity types, the procedure is to *replace* all the relationship types by an entity type plus two one to many relationship types. Each inclusive relationship type is then replaced by an attribute type belonging to the newly created entity type. As before each attribute type has two values.

In the example in Figure 2, the new entity type "Illness" has been created and the attribute type "Illness Cured?" indicates whether the illness has been cured or not.

Again, two entity sub-types have effectively been created: "Illnesses which have not been Cured" and "Illnesses which have been Cured" which resulted from the events "Person gets Illness" and "Person cured of Illness".

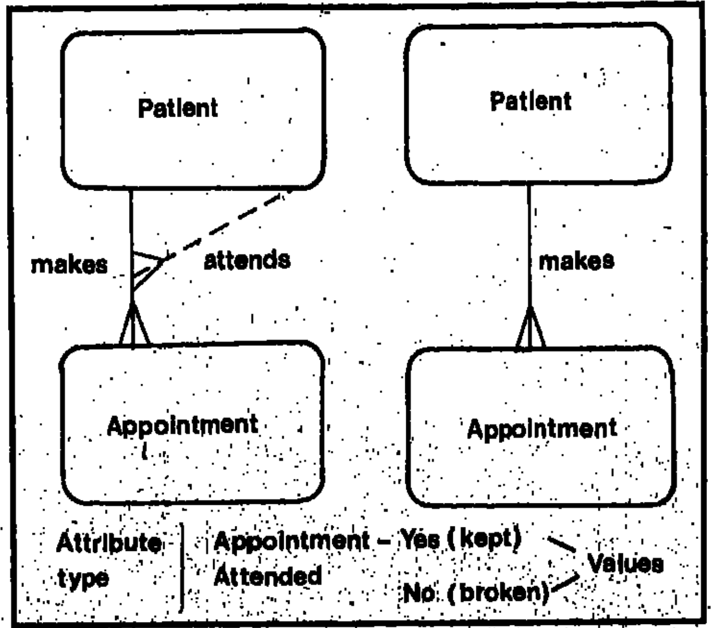


Figure 1. Replacing inclusive One to Many relationship types.

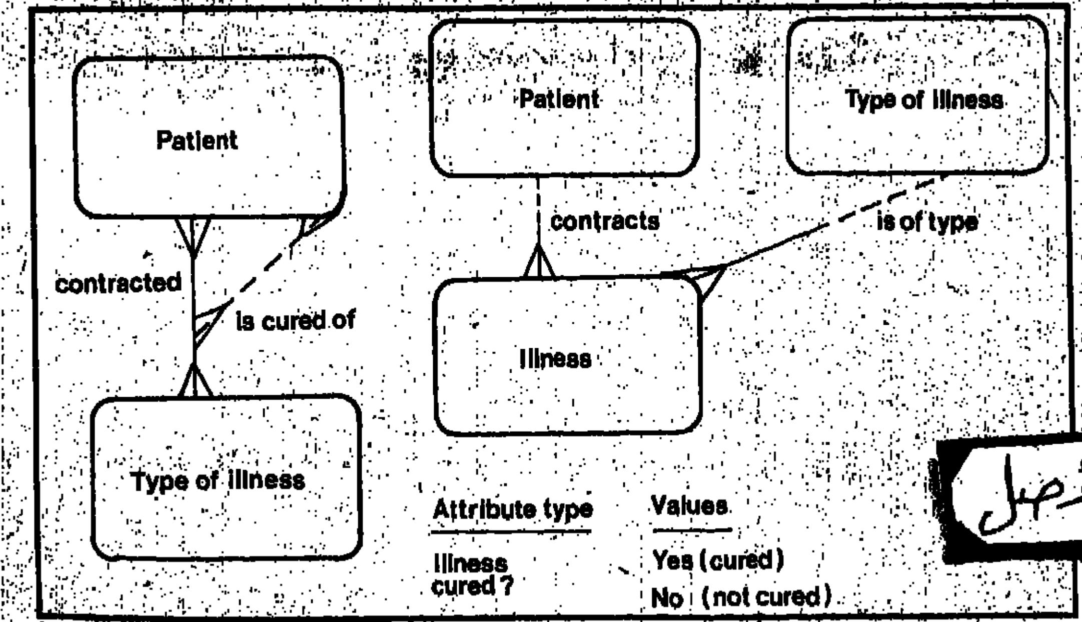


Figure 2. Replacing Inclusive Many to Many relationship types.

Exclusive One to Many relationship types

Exclusive relationship type describes the situation where either one or another relationship exists, but not both simultaneously.

An example is shown in Figure 3. A patient is either booked into a ward or is actually resident in the ward. He cannot be both. Where exclusive one to many relationship types exist between two entity types, the procedure is to replace each relationship type by a one to many relationship type and an attribute type having values which convey each of the original relationship type names. The attribute type is allocated to the entity type on the "many" side of the relationship type.

In the example in Figure 3, the exclusive relationship types "is Booked into" and "is Resident at" have been replaced by the attribute type "Patient's ward Status" with the two values "Booked into" (i.e. Patient is booked into ward) and "Resident in" (i.e. Patient is resident in ward).

This is effectively creating entity sub-types of "Patients who are Booked into a ward" and "Patients who are Resident in the ward" resulting from the events "Patient is Booked into ward" and "Patient Resident in the ward."

Where the resulting relationship type is operational, an extra value will always be needed denoting that neither value applies (i.e. the "null" value). In the example which follows it is possible the Patient is neither Resident in the ward not Booked into the ward (i.e. neither event has yet happened).

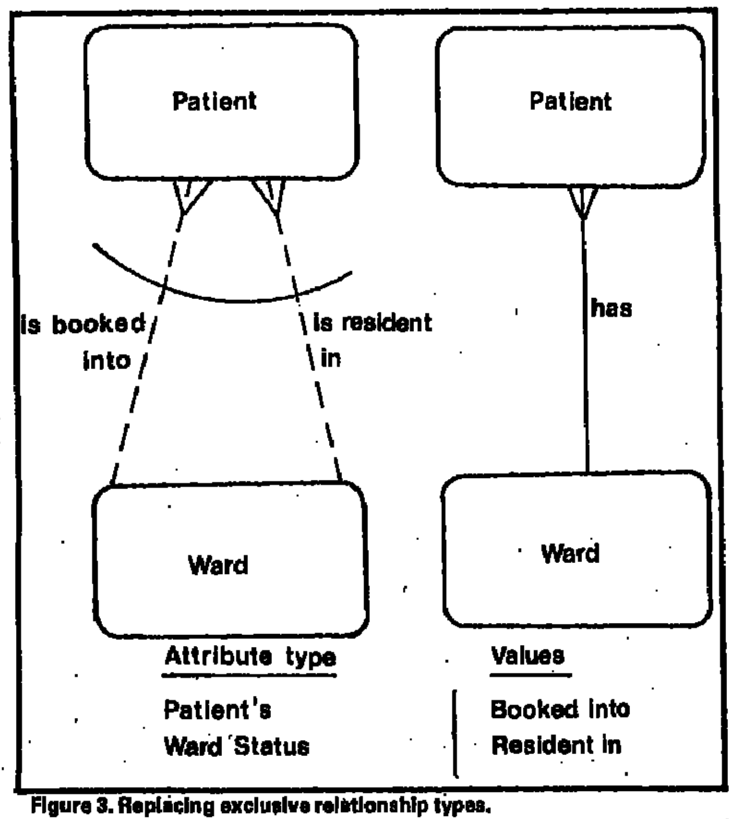


Figure 3. Replacing exclusive relationship types.

General Points about relationship types

The entity model is attempting to represent a dynamic environment with a static picture. It is thus important that the picture is valid over all stages of an entity's life and a relationship's life. Most of the examples of exclusive and inclusive relationship types which have been used were caused by *events*. It was stated earlier in the article on relationship types that verb tense was important, where a relationship type has a life which covers past, present and future — e.g.:

Patient is to undergo Operation (is booked in for)
Patient is undergoing Operation
Patient has undergone Operation

A generalised name for the relationship type should be chosen to cover its complete life and use of attribute types made to describe the events which change the relationship from past to present to future.

The relationship type names often used by the user are in the Perfect form of the verb, which indicates the action is completed or "perfected" at some present, past or future time. The best way to form a generalised name from the three "perfect" names is to use the "present simple" form of the verb, i.e. in the example above "undergoes."

The model will then be simpler, and more valid over time, and its dynamism will have been captured using the attribute types. In Figure 4 the simplified entity model of the hospital system is shown to demonstrate the point.

During functional decomposition, use was made of both optionality and exclusivity in describing the breakdown of functions. In each case a condition was associated with the function. It was stated in the articles on attribute types that many attribute types are meaningful only in terms of functions. The use of exclusive functions of optional functions is often a direct indication that attribute types are required and that these are representing entity sub-types.

If the function of "Handle Patients' Deaths" described in Part 10 is analysed, the sub-functions "May Cancel Appointment" and "May Cancel Operation" are dependent, firstly upon whether any appointments or operations actually exist, but secondly upon whether the Appointments and Operations are *about to happen* or *have* happened.

It is not only pointless but erroneous to cancel Appointments and Operations which have already been completed. In this case the Date of the Appointments and Operations would be used to determine whether the Operations and Appointments were about to happen or had happened, but where this was not available an attribute type would have been needed.

The function "Handle Patients' Deaths" also contains the exclusive functions of "Handle In-Patient's Death" and "Handle Out-Patient's Death." In this case it is obvious that the attribute type required would belong to the Patient entity type and have the values "In-Patient" and "Out-Patient."

It is interesting to note that this could have been derived from the entity model. A Patient is either resident in the hospital (In-Patient) or not resident in the hospital (Out-Patient), in other words these are two exclusive relationship types between Hospital and Patient.

The replacing of inclusive and exclusive relationship types from the model has several considerable benefits. It simplifies the model, it provides a very useful cross-checking method to ensure that all the events (and thus functions) have been covered, and it also shows where functions have perhaps not taken the different entity sub-types into account.

The use of functional hierarchies to determine entity sub-types is only part of the process normally employed to determine the attribute types, It is interesting to see, however, how the model and the functions tend to complement each other; again providing a method of cross-checking to ensure that all events and functions have been covered and all relationship types discovered. It should not be a surprise that this occurs. Functions create relationship types, modify them, and delete them, and the entity model is only a static representation of all the dynamics of the systems which act upon it.

In the next article the results of functional analysis and entity analysis will be combined in the technique of access path analysis.

The Data Analysis methodology was developed at CACI by Ian Palmer.

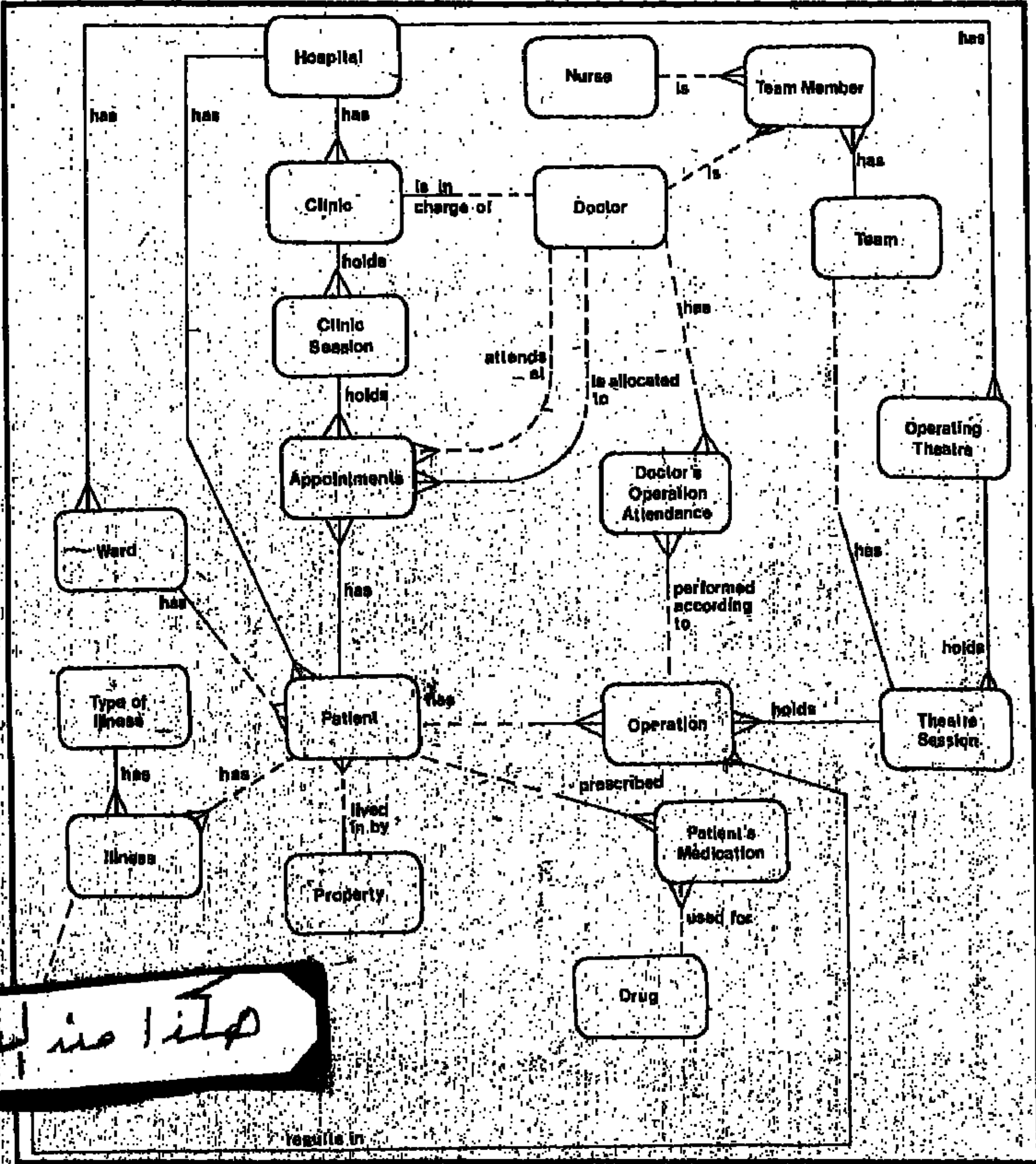


Figure 4. Simplified hospital model.

Computers can create knowledge – and information too

– SAYS SOFTWARE CONSULTANT ALAN SUTCLIFFE

Donald Michie says a computer can create knowledge but not information. Software consultant Alan Sutcliffe disagrees – he says information CAN be created. Here he explains why . . . and Michie responds.

THE story so far: Donald Michie (Privateview, July 24 and October 28, 1980) asserts that a computer can create knowledge but not information. I maintain (Letters, September, 1980) that a computer can create information.

Professor Michie gives a lucid exposition of the accepted meaning of *information*, and *create* seems to have a clear meaning: cause something to come into existence which was not there before.

With the terms agreed we still differ, as I believe that I have given an example of a program which causes information to come into existence.

Michie thinks not, so let me outline some problems and paradoxes raised by his thesis.

A computer can liberate information already latent in an algorithm, as a blowlamp can thaw (not create) water from an iceberg, he says.

Problem 1. Can a finite algorithm contain an unlimited quantity of information?

Somewhat to his puzzlement, Pythagoras proved that $\sqrt{2}$ is irrational: it is not the ratio n/m of any two integers.

It follows that the decimal representation of $\sqrt{2}$ continues indefinitely and without ever falling into permanent cyclic repetition.

The well-known algorithm for computing the digits of $\sqrt{2}$ is finite and can be specified completely on a small piece of paper yet is capable of producing an unlimited number of digits, which are information.

Unlimited

Admittedly, it needs a blowlamp of unlimited size, that is a computer (electronic or human) with no storage limit since computing digit $n+1$ entails using all preceding n digits.

I contend that this computer and algorithm combination creates an unlimited amount of information. If they produce 1.4 as the first two digits of $\sqrt{2}$, I would prefer to say recreate.

If they are used to calculate the hundred thousand millionth digit for the very first time there seems no doubt that this is an original creation.

There is an automata theory proposition which states that an algorithm + machine + store which are all finite can only generate a string of bits which must repeat eventually.

Such a system cannot write out the increasing sequence of integers without reaching one that it is too big for it to manage.

But my point is this: Donald Michie says the information is latent in the algorithm, not in the store or processor and a finite algorithm can generate unlimited information running on the right equipment.

Repetition

Problem 2: Does the ability to measure the information capacity of a source depend on cyclic repetition?

"Multiplying this by the repeating period of the output sequence (which must be finite, as is that of the pseudo-random number generator employed) gives an estimate of the music machine's total information content," we read.

Before we got a PDP-8 to generate pseudo-random numbers amongst other things 13 years ago, Peter Zinovieff at Electronic Music Studios employed a real-random number generator in the form of a a tiny radioactive source with a Geiger-type counter looking at the problem.

Nuisance

The unrepeatability of this device could be a nuisance. If you hadn't made a recording of the output, there was no question of "Play it again, Sam" as it was a genuine case of the lost chord.

That was not part of my music machine but could have been and that seems enough to put a spanner in the works of the "total information content" concept.

Problem 3: The relations between information content, algorithm complexity and musical interest (I will not say value or quality) are paradoxical.

Simple algorithms like random or repetition produce the dullest music and a more complicated algorithm is needed to make something more interesting.

That may give some random surprises and repetition, imposing some structure on the output.

The converse is not true and a complex algorithm may make dull music. All this is intuitively reasonable but this rough correlation does not extend to information content.

This is highest for random, lowest for repetition and somewhere between for more complex structures, as shown in figure 1. Noise is richest in information, but low in interest.

This paradox is not necessarily a problem for Michie's thesis, though it does show a limitation of the textbook definition of information.

Problem 4: What are information structures?

Donald Michie seems to make a concession at the end of his second article. "A computer can create new information-structures. It cannot create information."

What an information-structure is and how it differs from just plain information has not been made clear to me. Can you really create one without the other?

Problem 5. If an algorithm or computer cannot create information, who or what can?

Information exists which did not before: ergo, it must have been created. How? My answer is in all sorts of ways: computers, people, our cat, genetic chemicals, the sun.

I'm not sure about the last, but evolution is based on the creation of new information in genes – mutations – as life is based on its replication. What is Donald Michie's answer?

First bit

If a computer cannot create information, as he says, then presumably neither can any other machine. Is it then a purely human accomplishment? Was there not information on earth before we evolved?

Creating the first bit of information: that would have been an event worth recording. Or perhaps information is just not created at all.

While you are pondering over that, you may like to think also about how information can be destroyed – if it can.

Problem 6. Can knowledge be created or exist without information being created or existing?

Donald Michie is clear that a computer can create knowledge. But I believe that every instance of knowledge must have its representation as information in order to exist.

There is no such thing as knowledge without information, any more than there is mind without brain although this is another case where the converse does not hold.

Whereof we know, thereof we must be able to speak and speaking entails the transmission of information.

I will not dispute with Donald Michie, our foremost knowledge engineer, whether a computer can create knowledge. A more useful discussion would be about the range of meanings we might attach to the words proving this proposition.

Sutcliffe is the principal of software company Systems House Ltd and vice-president of the British Computer Society with responsibility for specialist groups.

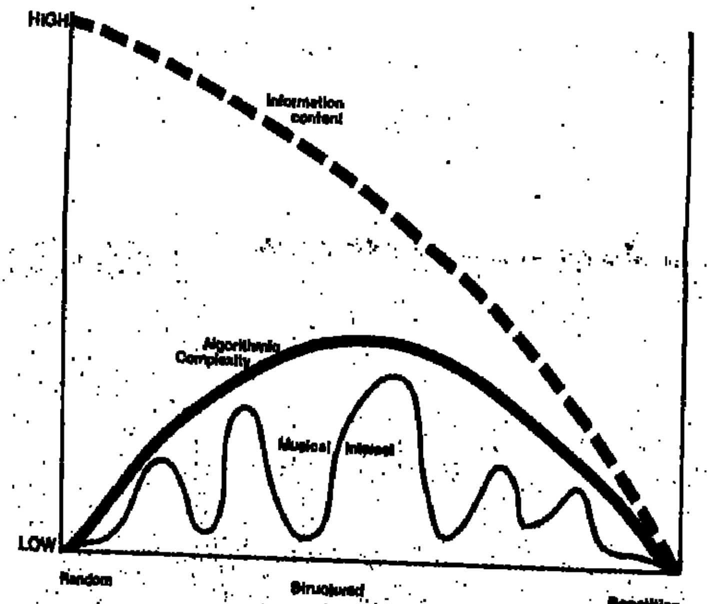


Figure 1

I disagree, says Professor Michie

USING arguments which fail to address the words which I actually wrote, Alan Sutcliffe expresses the counter-view that a computer *can* create information. My words included the following foundation statement.

> "... *consider the information-content of a finite source. In the case that it is deterministic, we identify this with the quantity of information transmitted by the total message which the source is capable of generating.*"

I demonstrated how an experimental estimation can be made of the amount of information latent in such a source – for example, Alan Sutcliffe's music-generating program.

I likened a concert given by the Sutcliffe machine to applying a blow-torch to an iceberg.

Just as some fraction of the total water-content of the iceberg is converted from frozen to liquid form, so by running the music machine we convert some fraction of its contained information from one form (implicit) to another (explicit).

Problems

Sutcliffe does not like this and believes that his program "causes information to come into existence".

He prefers to think that prior to run time this information did not exist, even in implicit form. In support of his position, he poses a succession of problems.

Problem 1. Can a finite altorithm contain an unlimited quantity of information?

Nothing at all had earlier been said about finite *algorithms*. My foundation statement refers to a finite *source*, which in the context of computation comprises a finite algorithm *plus* a finite machine *plus* a finite store.

Limited as we are to operating within the bounds of the observable universe, we lack the means of housing non-finite embodiments of any of these three.

Sutcliffe's Problem 1 is thus beside the point. I have no objection to crediting an *algorithm* with infinite information-content.

Once it is paired with a (finite) computer so as to constitute an information-emitter (source), the information which can be contained is no longer infinite.

Problem 2. Does the ability to measure the information capacity of a source depend on cyclic repetition?

Sutcliffe produces a set-up in which a radio-active source is enabled to feed truly random numbers into the computer via a Geiger counter.

My foundation statement specified that the source be deterministic. The Geiger-driven machine is thus wholly irrelevant to the matter under discussion.

Problem 3 concerns the *interestingness* of messages. It is declared to be "not necessarily a problem for Michie's thesis".

Problem 4. What are information structures?

In my next Privateview some specimen information structures will be exhibited and an answer supplied to Sutcliffe's supplementary question: *Can you really create information structures without creating information?* The answer is "Yes".

Problem 5. If an algorithm or computer cannot create information, who or what can?

As was spelled out by the late Norbert Wiener, the answer is "No-one". Wiener linked Shannon's new theory to certain well-established concepts of physics, pointing out that information behaves like negative entropy.

Hence, within a closed system there cannot be a net creation of information any more than there can be a net reduction of entropy.

Our own planet, in which a net increase of information has arguably been engendered by the growth and evolution of its biosphere, is an *open* system, fed by ceaseless input of energy from the sun.

Alan Sutcliffe has stumbled by overlooking this distinction and forgetting that real as opposed to ideal digital computers belong to the *closed* category.

Unthinkable

Problem 6. Can knowledge be created or exist without information being created or existing?

Knowledge cannot exist, nor can it be created, without information existing. But it can both exist and be created without information being created within the system.

A net increase in the information-content of a closed system is as unthinkable as would be a net increase in the water-content of an iceberg isolated from extraneous sources.

Basic similarities between the iceberg-blowtorch system and "algorithm plus processor plus memory" become evident from inspection of concrete cases.

Donald Michie

Although case studies have long been used as an effective aid to management training, it is only since 1973 that the Case Clearing House for Great Britain and Ireland has been in existence. However, there was a distinct lack of case studies relevant to the data processing trainee, until the National Computing Centre, with the help of government backing, stepped in. RON BROWN, education and training liaison manager at the NCC, describes the NCC's progress so far, detailing the necessary standards to be applied in the sector of the Case Clearing House's bibliography concerning the computing profession, and suggesting that readers may be able to help the work.

A valuable aid to DP training

From left to right: Jeff Gray (CCH), Prof Peter Forrester (CCH and the Cranfield Institute of Technology) and author Ron Brown.

CASE studies are to the management trainee what jousts were to the aspiring knight errant and flight simulators are to the modern pilot. They provide an effective way of learning, not least through one's mistakes, without endangering life, limb or the earning of profits.

Although, as a means of management training, case studies have been in general use for a long time, it is only as recently as 1973 that the Case Clearing House of Great Britain and Ireland was established to collect and distribute case studies. Today the CCH has over 7,000 master copies of such studies, and it distributes bibliographies and a regular bulletin of information about them.

However, it lacks relevant case studies to meet the needs of those involved in the training of computer staff, including systems analysts and programmers. As with all types of professional training, effective training of computing staff demands learner experience in a simulated work atmosphere.

Pioneered by the National Computing Centre in 1967, the Basic Systems Analysis Course included case study material which is still used in training courses. Among computer professionals, interest in case study methods of training has increased since then, to the extent that the new BEC/TEC curricula for HNC/HNDs in computer studies require the integration of the method.

Practical

Many types of case study are applicable to computer staff training, but those case projects which can provide extensive experience in simulating the whole or part of the computerisation of a system are of the greatest practical value to the student. Their successful use depends upon the tutor fully understanding the detail and environment of the case.

In its role of researching and encouraging the development of new areas of computing, NCC gained government backing to establish a clearing facility to generate more widely used and improved case studies. Initial research by NCC soon revealed the need to make available a more extensive range of relevant and complete case studies, which would be readily identifiable and realistically priced.

The differing needs of training courses and establishments were clarified by NCC's association in 1979 with Manchester Polytechnic's conference on the use and development of case studies for BEC/TEC HND/HNCs in computer studies.

Accessible

The conference confirmed the need for portable, relevant computing case projects – these were rare.

Following the Manchester Polytechnic conference, NCC established a representative editorial committee of case project experts to assist with the development of new and existing studies. This was an important step forward in making practical DP case projects accessible to lecturers and course developers.

The first aim of the committee was to establish necessary standards to be applied in a new sector in the CCH's bibliography concerned with computing case studies.

The committee's three-point plan to provide practical standards for the content and layout of case projects was defined. It stated that the standards should be readily understood and acceptable to the author; physically economical, thus ensuring a low cost product; and finally, sufficiently comprehensive to ensure that the user finds the case study easy to understand and to apply.

Following extensive tests and trial application of the first cases, the committee established five points for the standard: summary specification; scenario; tutor's guide; assignments; and suggested solutions.

The summary specification provides a contents list and details of learning objectives, a resumé of case, resources required, teaching and assessment consideration, and a course for which it is used or recommended.

Bibliography

Copies of summary specifications are assembled to make up the bibliography, thereby providing ample information to training staff seeking case studies.

Thus, information contained in the resumé provides the first level of classification/index, the second level being via the topics covered, as indicated by the author of a pre-printed topics list.

The basic case study is contained in the scenario, which would normally be handed out to the students to set the scene for the subsequent work. These will be available on request, as the inspection copy, providing a further level of effective scrutiny for potential users.

The existence of separate specific sections should ensure that the details of assignments and suggested solutions do not appear in the scenario. Some overlap may be justified, but full use should be made of the Tutor's Guide section to restrict the scenario to its allotted task.

Full details

Portability of a case project largely depends on the Tutor's Guide, with its overriding objective of enabling people other than the author to run the case successfully. Where necessary, it will contain further information on the scenario, particularly where this should not be made directly available to the trainee.

The guide should provide full details of methods and procedures involved in using the case, including the timetable, resources required, checklists and role playing briefs. This section of the case project should only be issued to the training staff and, therefore, numerous copies will not normally be required.

Assignments section contains a clear description of the practical work required of the student, preferably laid out so that each assignment may be copied and issued to the student as required by the tutor running the case project. Information and explanation for tutors should therefore be in the Tutor's Guide, not in the Assignments section, and this, like the guide, will only be issued by the Clearing House against a written request.

Similarly, suggested solutions will be restricted in their issue from the Clearing House. As the title of the section implies, in most cases acceptable solutions to each assignment can be many and varied, but at least one accurate version, reflecting good practice and acceptable standards should be included.

Where there are a number of assignments in the case project, each one developing from the previous, it is essential that the solutions match in scope and detail. In practice, it will often be necessary to use the suggested solution for one assignment as the starting point for the next piece of work.

Selected case study authors attending NCC's three day workshop used the standards to develop and specify their cases. Consequently, ten new cases went into the Clearing House, and more will follow from similar exercises and the independent efforts of individual authors encouraged and guided by NCC.

Plans for training lecturers who wish to start using the case study teaching method are now being undertaken by the committee, to be completed this winter.

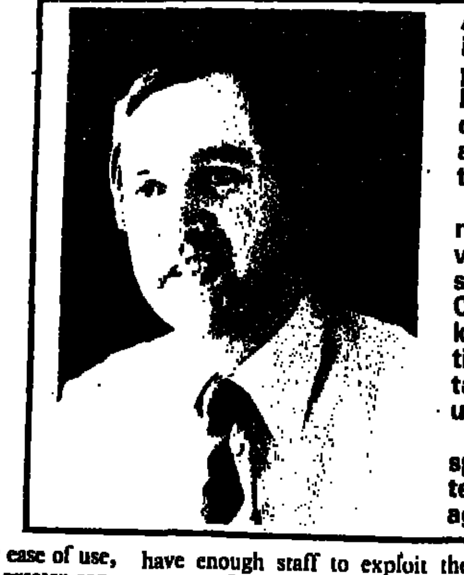
The association between NCC and CCH is already leading to practical and beneficial results in the form of training material for DP tutors and trainees. By fulfilling this national role, the partnership has benefited the entire computing community, but there is a continuing need for DP professionals to submit a regular flow of case studies reflecting current technology to the Clearing House.

Both existing case material and documented practical work that could form the basis of a case study are needed to continue the successful development of the Clearing House's bibliography, to include all types of computing case studies.

Perhaps you could help. If you believe you might have some suitable material, or wish to have further details, please contact the author at: The National Computing Centre, Oxford Road, Manchester, M1 7ED. Tel: (061) 228 6333. The other members of the committee would also welcome inquiries. They are: R. A. Coates, Sheffield City Polytechnic; B. S. Lee, Manchester Polytechnic; C. J. Tully, University of York; J. Ward, The Polytechnic, Huddersfield; and J. A. Gray, Director, The Case Clearing House of Great Britain and Ireland, Cranfield Institute of Technology. The author will supply their addresses.

Why users turn to a database management system

by Nicholas Pollard



Author Nicholas Pollard is managing director of Applied Data Research, and has been involved in software products, including sales, support and marketing experience, for the past 10 years.

Before his present appointment in January 1980, Pollard was with CAP-CPP, first as UK sales manager and later as CPP software product marketing manager with additional responsibility for certain ADR products marketed under licence by CPP.

Before CAP-CPP, Pollard spent several years as Computer Technology product manager.

DURING the past decade, a vast amount of money has been spent by users, manufacturers and telecommunication administrations on the provision of teleprocessing access to computers.

By mid-year it is forecast that nearly a third of all IBM users will be using TP. The National Committee on Computer Networks has reported on actual and expected growth in communication-based systems.

The purpose behind all this investment is simply to create an access path from system user to computer. But what happens when the user reaches the system?

All too often he finds the information he wants to access in complex forms which are far from convenient for real time manipulation and which are far too rigid to be modified easily to his needs.

It is as if we spent millions of pounds constructing a six-lane highway to a city, only to place at the city gates an impenetrable maze in which the traveller soon got hopelessly lost.

To capitalise on investment already made in basic computing and on the further TP investment, the user must make further investment in a mechanism to make the data in his system more accessible.

That mechanism is a database management system, DBMS, and it is upon choice of a DBMS and the critical factors influencing that choice, that this article serves to focus attention.

Practical

Why do users turn to a DBMS? Although there is a large corpus of theoretical research on the database, the real reasons are practical.

Many computer installations have been increasing their data volumes for each of the last 20 years as businesses grow and new applications are added.

Data may be duplicated in several files and the complex mesh of inter-file and inter-record links necessary to exploit such files in a non-DBMS environment soon becomes totally beyond human control or comprehension.

In its simplest terms, a DBMS is a single logical construct designed to provide a data repository.

How successful has the initial application of the DBMS proved to be? To nobody's surprise, users have found that DBMSs demand an investment of time, effort and money. They are often complex systems in their own right and users must be ready to go through a learning process before they get the full benefit from them.

It would not be an exaggeration to claim, on behalf of DBMS users, a high rate of success among those who have persisted in seeking tangible benefits.

The benefits they have achieved include reduced programming effort through greater ease of use, less data duplication, greater consistency of data and faster response to new user requirements.

These benefits are all of interest to a DP manager with demanding users and scarce resources of manpower.

Given that benefits are available to be won by the use of a DBMS, and that the IBM user has at least a range of choice, what criteria are likely to influence his selection?

To some extent these criteria mirror potential benefits. The DBMS must be easy to use, in terms of program development, database design and database maintenance.

Otherwise, the user will not have enough staff to exploit the system. In particular, the individual application programmer must find a high degree of data and structure independence.

With this, he can ignore the physical layout of the data (the stored image) and need not change his programs when the database is amended by, say, adding a new data element.

It is important for the database administrator to express his database design and respond quickly to changing user needs. He should be able to add and delete data elements, add keys and express new data relationships without major design effort.

Three models

To management, who must authorise acquisition of the DBMS, it is also important simply to be able to understand the issues involved in the choice.

Of all methods of representing data in a model, three are the most familiar and are the bases of the systems available to users. They are hierarchical, network and relational models.

In a hierarchical model, data is represented as a tree structure with data at higher levels depicted as "owning" data at lower levels. The network model views data as having a logical two-way relationship.

The relational model is much less rigid and allows any number of different views of the data to be taken. In the world of the physical database there are only two widely-used approaches.

First is the embedded pointer, where the link between one record and the next is contained within the record. Second is the inverted list, where an external data index is maintained.

Different products combine different logical views of the data with different physical treatment. For instance, IBM's IMS (or DL/1) takes a hierarchical view of the data and implements it via embedded pointers.

It also allows users to view the same physical data in several logical ways, imposing alternative hierarchies on the stored image. But in this case, data independence is imperilled severely.

Network concept

Programmers have to concern themselves with data structure and the database administrator with the needs of the individual application program.

The logical view and the implementation strategy are entwined so closely that even minor changes to the database may require major physical rebuilds.

There are two well-known systems built upon the network approach – Total from Cincom and IDMS from Cullinane. Like IMS, they are also organised physically around the embedded pointer. The network concept expresses more effectively the logical relationships between different data elements.

Unlike IMS, however, these systems do not tie the user to viewing data both physically and logically. They achieve a better level of structure independence by this approach.

However, the user has specified entry points to the data structures and the applications programmer must "navigate" his way around the database. Using embedded pointers also means that database changes are still a problem.

The most recently adopted approach to database is the inverted list approach as instanced by Adabas from Software AG, System 2000 from Intel and Datacom from ADR.

The major difference between these and other systems is that data access is via an external index, usually known as an inverted list. The physical organisation of the data can be kept to a simple flat file.

These two characteristics lend themselves well to the relational approach – after all, a "relation" is no more than a number of associated elements, that is, a record.

A great attraction of the relational approach is that it can be used to represent any other logical view of data, including the hierarchical or the network view.

From a practical point of view, an embedded-pointer system would suffer an unacceptable penalty because the route through the data is mapped out essentially within the data itself.

The major benefit of the inverted list approach to physical organisation is not just that many logical views of the data can be defined.

It is that they can be modified or increased more or less at will, without affecting the physical data or the application program not concerned with the new data elements.

Simplest

Clinching argument for the inverted list database approach is ease of understanding, as anyone who understands the concept of a sequential or flat file can master this approach.

Some of the most advanced concepts in system design still turn out to be the simplest. What are the problems with inverted list database design?

It is said sometimes that this design is best suited to sequential processing and it is true that systems like Datacom are extremely fast at sequential processing.

However, the index is also well suited to random access and sometimes efficiency questions arise through claims that inverted list systems are capable of representing relational structures.

Stories are rife that IBM is delaying release of a relational database because of "performance problems".

To some extent, this speculation was confirmed by Dr Frank King of the IBM Palo Alto research centre in the course of a speech given at the IFIP Congress in Melbourne.

The current performance of IBM's relational DBMS (System R) was described as up to 50 times less efficient than a hierarchical system and up to 100 times less efficient than a DBMS embedded in an application system.

Dr King also cast doubt on the feasibility of providing bridgeware to help IMS users migrate to System R – the first time such doubts have been publicly expressed by an IBM spokesman.

Only time will tell whether such pessimism about System R is justified but if it is, the reason may be that IBM is seeking the ultimate solution to database problems.

This is the full relational model with all facilities, envisaged in the theoretical work of E. F. Codd. Few knowledgeable database observers envisage implementation of a pure relational model this side of the 1990s.

هكذا من الأصل

A package that helps to cope with decisions

Hundreds of software packages will provide numerical or "technical" assistance to help us make decisions. Few, if any, tackle the often more worrying personal and political aspects of those decisions. A team at Bath University's school of management has spent the last few years producing software to give just this sort of help. TIM SMITHIN and COLIN EDEN, two members of the team, report.

SOMETIMES the decisions we, and others in our organisation, are called upon to make are complicated and messy. Often, besides involving difficult technical or financial problems, there are also delicate personal, political or highly subjective considerations.

There are hundreds of computer software packages designed to assist with the "technical" or numerical aspects of decisions, but we may look in vain for help from the computer with the more judgmental, and often most worrying, factors involved in a complex decision.

Over the past few years an interdisciplinary team brought together at the School of Management of the University of Bath has been developing software aimed at providing just this sort of help for decision makers.

Traditional uses for the computer have led people to see them only as giant "number-crunchers", restricted to working with those aspects of problems that are well-defined and readily quantifiable. Indeed, many applications packages reflect this constraint.

The consequence of this type of restriction is that one is often forced to define problems as what can be modelled by the software. This typically happens to such an extent that the decision maker becomes uninterested in the help that a computer model can provide, because the model created has driven out those aspects of the problem which he regards as most important.

COPE (COgnitive Policy Evaluation) is a software package which enables users, who may be not be computer experts, to create, develop, and explore qualitative and subjective aspects of problems. The exploration may naturally lead to a quantitative computer model, but only after the decision maker has considered other aspects of the problem and decided that this will help.

No longer is a user forced to express the problem in dry, uninteresting and often misleading numbers, weights and rankings just because the model demands it. The basic contents of a Cope model are ideas, beliefs and assumptions and their relationship to one another expressed in the language of the decision maker.

Cope enables the decision maker to describe his views on an issue and to capture them in a computer model which can then be used as the basis for analysis, elaboration or sharing with others in the organisation.

The above emphasises the way in which Cope is used to help decision makers solve problems. It has also been effective in helping:

- Systems analysts form an effective communication medium between analysts and client, and analyst and programmer.
- A variety of teams in housing, community action, publishing, and charities to share their beliefs and ideas about strategy and long-range planning.
- Students as a part of an interactive programmed learning exercise.
- Individuals to conduct a sort of "life planning" exercise through self reflection and self learning.
- A person to develop and check the arguments he will use in a report or meeting.
- To record the minutes of a meeting in such a way that the ideas and points expressed are clearly related to one another, and immediately available during the meeting.

Behind Cope is an approach to assisting individuals or groups in organisations, which emphasises the need to listen and reflect each person's views on an issue.

We are often beguiled in this age of modern science, of which the computer industry is a spectacular example, into imagining that every problem has potentially a hard and fast answer, that once the "facts" are revealed all reasonable men must bow to an inevitable solution. We tend to forget that individual judgment and interpretation of what the "facts" mean or even of what the "facts" are, become very significant aspects of any issue.

We equally tend to play down the importance of the role of each individual's own values and purposes in determining outcomes.

Thus the keynote of Cope is *listening* to the things that matter for an individual, and attempting to reflect them in the model.

Individual

Our experience suggests that in order to construct a model which a client will feel committed to, and use, careful attention to the detail of individuals' understanding of an issue is essential. A reasonably detailed and authentic picture of the issue as an individual or perhaps a group sees it is the starting point for work with Cope.

The software has been designed to pay attention to the concerns expressed above, and has attempted to make the user-machine interface as friendly and relevant as possible, without becoming gimmicky or trivial. An important contribution to the friendliness of the software was the evolution of Cope in direct response to users' needs, and the close interaction between the system designer, Jim Wiltshire, and the rest of the team.

Data entry is interactive via a keyboard terminal, and as there are very few format requirements, data can be typed straight in.

A set of routines then interpret and assemble the data into the appropriate format for the model.

Changes and checks on input can be entered at any time, and there is also an extensive and graded set of help messages to guide users through data entry, so only a very minimal training is required for a user to begin to build and use the model.

Current developments are aimed at making this process even simpler through the use of graphics screen and light pen, and a question and answer dialogue section for those users who prefer this way of entering data. Data manipulation and model simulation are similarly designed to respect individual needs.

No concessions

Commands are either one or three letter mnemonics, which may either be used singly, or for more experienced users can be combined to perform the more complex analytical tasks available in the model.

Cope has been a "programmer's nightmare", since we have made no concessions to programming ease. All the developments have stemmed from comments (nice and nasty) made by users.

The heart of Cope is the network of concepts and their effects on each other derived from a "cognitive map", which is a picture of the problem as seen by an individual. In many ways it is similar in form to flow charts or network diagrams – in a Cope map, the nodes are the concepts expressed in the words and phrases of the individual concerned.

In the same way that it is possible to trade through a flow chart, Cope explores the network of concepts and can for example highlight the consequences of a particular policy or change in other concepts. The user can thus gradually explore the possible consequences of his actions and policies in a more thorough and systematic way, than by just "doing it in his head".

Cope is a way of simply dumping ideas out of your head, and by freeing your mind in this way you can often look at those ideas more clearly and carefully. Like doing a long division sum, there comes a point when you can't keep it all in your head and you turn to a pencil and paper for help.

'Pencil'

For more complex problems Cope acts in a similar way. As one of our clients recently put it (the head of research of an international company): "I viewed Cope . . . as a pencil allowing me to draw out my thoughts, thereby allowing other [concepts] to come from within my thoughts, some of which I had been unable to see clearly before."

Cope has now been in use in a variety of situations. Typically, users either work with the model at the university, or have continuous access via a dial-up line. This latter facility means that use of Cope is now a relatively cheap and simple operation, and does not require expense in hardware.

For example, it has been used in the publishing industry to help an editorial team re-think their policy, in a local government housing department to assist senior officers to think through housing policy issues, in a national charity to help generate new ideas for fund-raising, with a local community group to assist them in planning their future developments, and in the furniture industry to examine issues around machine purchases.

In each case, the flexibility of Cope has enabled us to build models which adequately represent the issues as the participants viewed them, and thus encouraged the exploration of the issue.

Cope, then, is an attempt to put into practice two principles about computing to which, with the growth of personal computing, all of us concerned with computer modelling must pay special attention:

1. You should not have to know anything about computers to be able to use them.
2. Computer models must move away from the more technical aspects that they have tackled to date, and begin to explore less well-defined and more judgmental aspects of problems.

In Cope we have begun to build both an approach to modelling and the software to go with it, to make computer power available to individuals and to enable them to get to grips with some of those less tidy aspects of their problems. At a time when personal computing is expanding rapidly and computer power is available to an even wider and non-technical audience, it seems important to think more about the kinds of models that will be useful to users.

Note: The Cope software package has recently been released for purchase by industry, commerce and teaching establishments. It is written in Fortran IV and can be transferred to most machines with a minimum of modification.

> "When necessity demands it – as during the Second World War when Britain was forced to drastically reduce its dependence on imported food – Governments proved quite able to organise rational and efficient use of open spaces . . . yet the same bureaucratic machinery has produced the urban wastelands that become commonplace . . . allotments contribute to Britain's food requirement . . . the concern of authorities for making use of open space declined with the absence of war pressure . . . 'cabbages in the Royal Crescent' are seen as detrimental to the future of Bath as a tourist centre . . . there is a greater concern for a higher 'Britain in Bloom' rating . . . no doubt the fall in the number of allotments is because public interest in gardening has declined . . . but there is also commercial pressure for the release of valuable urban sites" (extract from Bath Community newspaper Spark, August 4, 1978 – slightly modified).

Figure 1. Extract from a discussion about community land use in Bath.

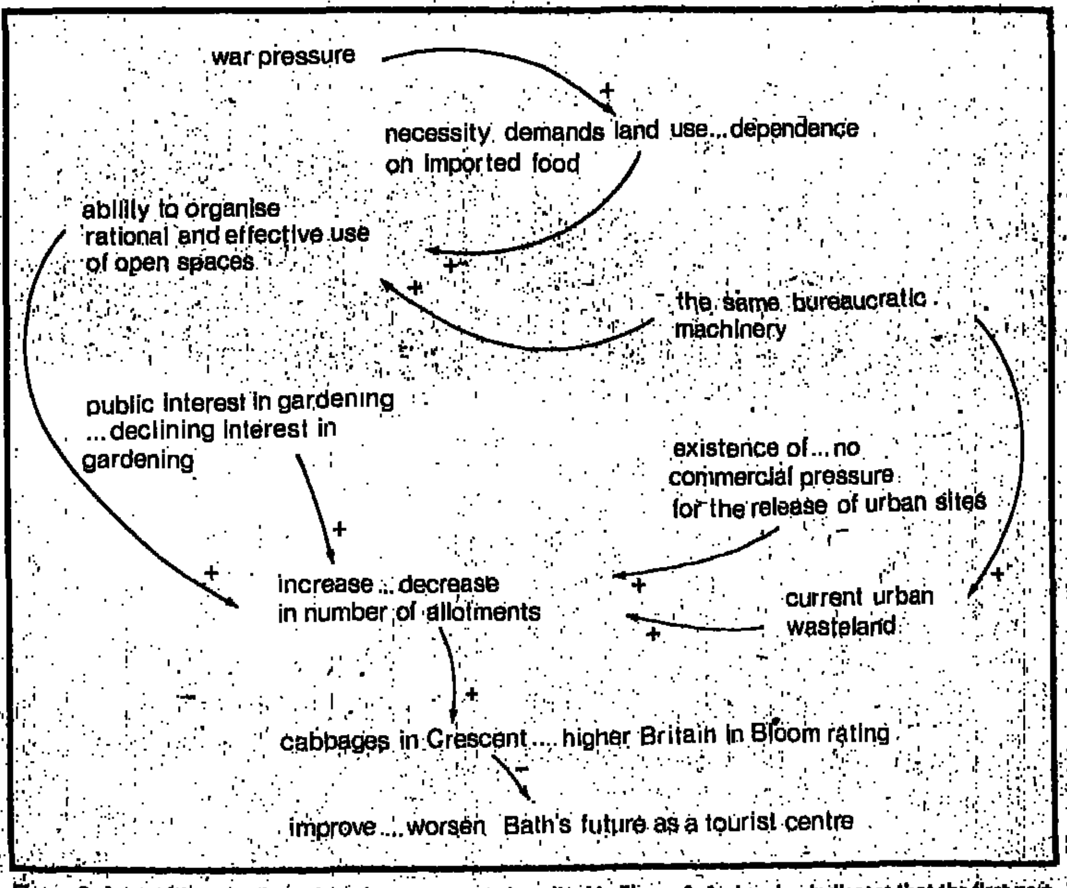


Figure 2. A cognitive map based on the arguments described in Figure 1. A plus sign indicates that the first part of one concept leads to the first part of the other concept. Thus "increase in the number of allotments" leads to "cabbages in Crescent" and conversely, "decrease in the number of allotments" leads to "higher 'Britain in Bloom' ratings."

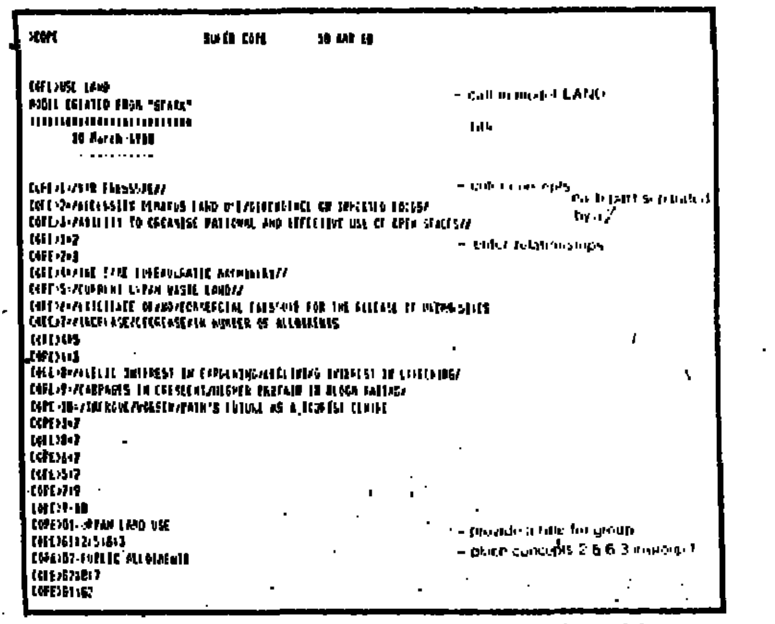


Figure 3. Illustration of the data entry process for a simple model.

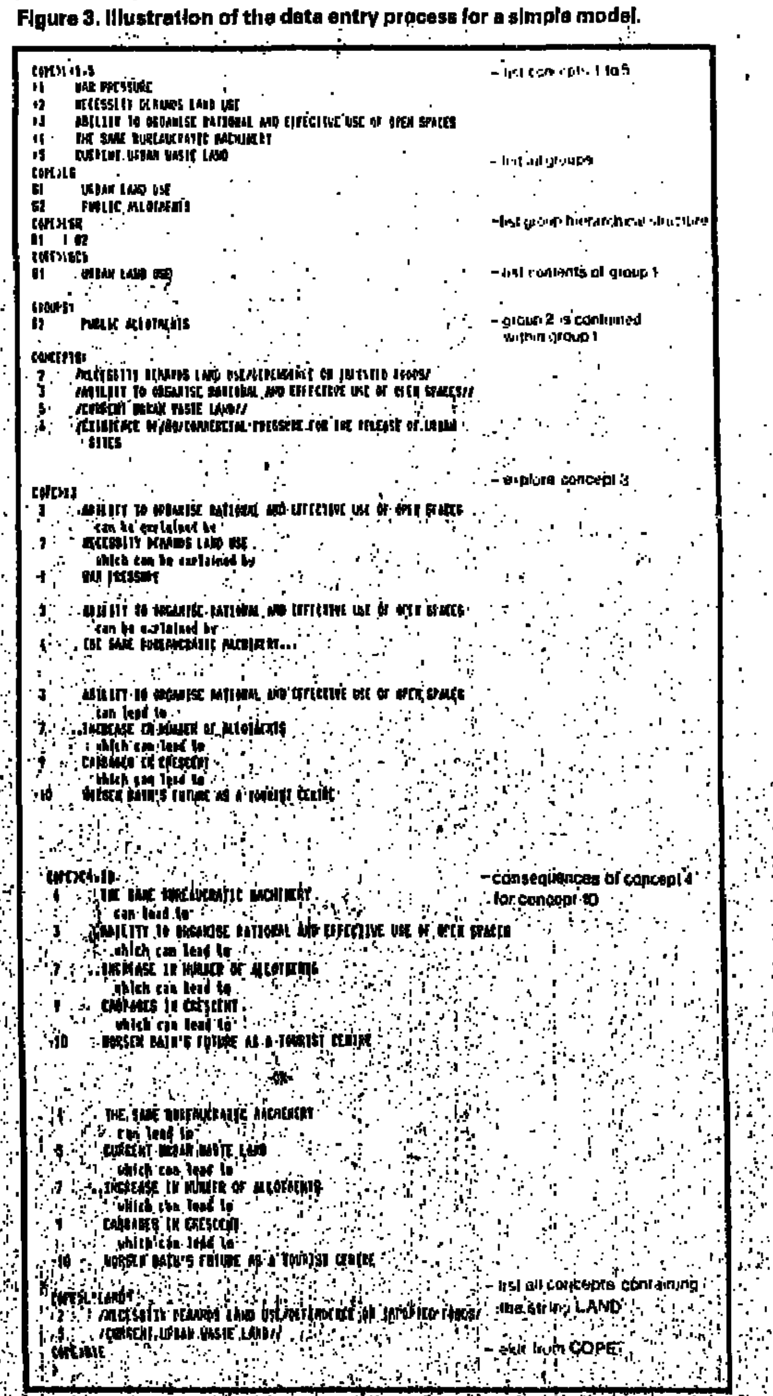


Figure 4. Model exploration, showing a typical way in which a model might be explored: using the group structure to identify areas of interest then focussing in on particular concepts and their consequences.

Versatile camera system

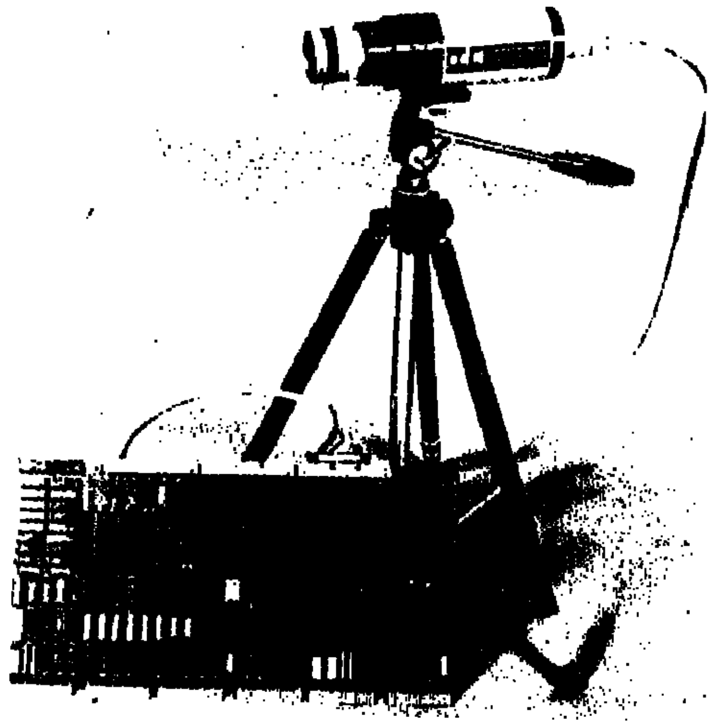
DEC-based Arrow Computer Systems has introduced a solid state computerised video camera system which acquires and stores data under the control of a DEC PDP-11.

Designated the MIP 3/V, the apparatus is the latest in the range of micro-based input processing systems from Computer Design and Application Inc and is designed for use in process control, instrumentation and engineering.

The MIP 3/V comprises high speed micro-controlled input processor board, a 16K-word dual port memory board and 128/128 × 8 bit per pixel solid state camera equipped with a 25mm, f1-4 lens.

Priced at £4,320 and deliverable within 45 days, the system may be used for continuous data acquisition or perform real time integration processing.

Arrow Computer Services Ltd (CW), Rosemount Tower, Stafford Road, Wallington, Surrey SM6 8RW.



Arrow Computer Systems' MIP 3/V video system is designed to cater for a wide range of applications in process control, instrumentation and engineering. There is an additional bonus for the OEM user who can apply custom firmware to give him or her the facility to take full advantage of the MIP-3V's high speed processing potential.

Full-colour display terminal for military applications

AYDIN Controls has introduced a new full-colour graphic dual-display terminal designed to meet "Tempest" requirements for electromagnetic-interference suppression in military and allied high-security applications.

Designated Model 5804, the new system meets the reduced requirements of the NACSEM 5100 specification and incorporates two cathode-ray-tube displays according to customer specifications.

Both full-colour graphic displays and monochromatic alphanumeric displays are available to form the combination best suited to users' needs.

The new dual-display system allows users to view graphic command and control signals in conjunction with detailed alphanumeric interrogations or alongside another colour graphic display.

Incorporating an Aydin 5216 display computer, the system is fully modular; "off-the-shelf" units can be supplied to meet customer needs, and the terminal has both editing and full operator-entry facilities.

The 5083 display terminal interfaces to a host computer via a customer-supplied "Tempest" qualified serial interface and serial data are passed to a 16-bit microprocessor for processing via customer-supplied software.

Display instructions are stored in a program memory for processing by a display generator.

In a standard configuration, the memory stores graphics presentations in five 512 × 768-point refresh memories. Configurations of up to 1024 × 1024 × 16-bits are available.

Refresh memory data from the display generator is interpreted by a video-driver look-up table providing composite video information to a high-resolution 19-inch red/green/blue colour monitor.

The display generator also provides an alphanumeric generator to drive a 14-inch high-resolution monochrome monitor.

Full text-editing capability is provided by an alphanumeric channel controlled by a keyboard and a 90-key function keyboard is also provided for user-defined applications.

A "joystick" is incorporated for alphanumeric cursor movement and either graphic cursor movements or graphic drawing.

Aydin Controls/Vector – UK (CW), Andre House, Salisbury Square, Hatfield, Hertfordshire AL9 5BH.

Enhanced floppy disc launch

ZYGAL Dynamics announces enhanced versions of its MiniMate and DataMate floppy disc storage units, DataMate II and MiniMate II being improved RS232 compatible mini floppy store and edit terminals.

The innovations extend capacity and capability of Zygal's existing series at no additional cost.

Both existing units provide 163K storage as standard and can contain up to 1280 addressable records of 128 characters with optional storage capacities of 328K, the most available in any mini floppy terminal, the makers claim.

DataMate II adds powerful editing capability to non-intelligent terminals without the need for special program discs.

MiniMate II complements intelligent terminals by providing a character edit mode for editing by character.

A new global search and replace feature is provided on the DataMate II which allows the user to search a complete file for a word or statement.

Two additional search modes allow the first or each occurrence of a variable to be found for listing. MiniMate II offers a simple search mode that finds the first occurrence in a file.

Both units have store and forward capabilities, communicating in batch or line-at-a-time mode at switch selectable rates from 110 to 9600 baud.

Zygal Dynamics Ltd (CW), Zygal House, Telford Road, Oxon OX6 0XB.

Mini-Printer with market appeal

THE Mini-Printer introduced by Digitronix is a compact 32-column printer which the company claims to be the lowest-priced universal printer available, retailing at £195.

The *Mini-Printer* accepts conventional Ascii Serial inputs at RS232, TTL and 20 mA current loop levels, at seven baud rates from 110 to 4800.

It can interface with almost any microprocessor-based machine and supplements these user-selectable options by also accepting data on a parallel port.

An electrosensitive mechanism, the printing unit deploys the 64-character Ascii font at 64 characters/sec on to aluminised paper rolls 59 mm wide.

The unit operates quietly and incorporates several features, including double-width characters and back spacing. On automatic test mode, it will print out a sample character set.

Made for the professional market, the unit is built to high standards throughout and housed in a 277 x 138 x 70 mm rugged steel case.

Mains power is used but there is provision for low voltage DC input, primarily for applications where other Digitronix equipment is interfaced.

A versatile instrument, the Mini-Printer incorporates microprocessor-based architecture which facilitates reprogramming for special applications.

The print font can be changed and, besides alphanumeric units, the output can be converted to create graphic dot patterns, representing analogue expressions of measured parameters, for example.

The *Mini-Printer* is a general purpose printer usable throughout the communications, control and data logging fields.

Because of low cost and versatility, it should find application in diverse areas, including scientific research and point-of-sale terminals.

Digitronix Ltd (CW), 10 Burners Lane, Kiln Farm Industrial Estate, Milton Keynes.

Shake-up for WP industry

● From front page

another. Up to four workstations can share a printer.

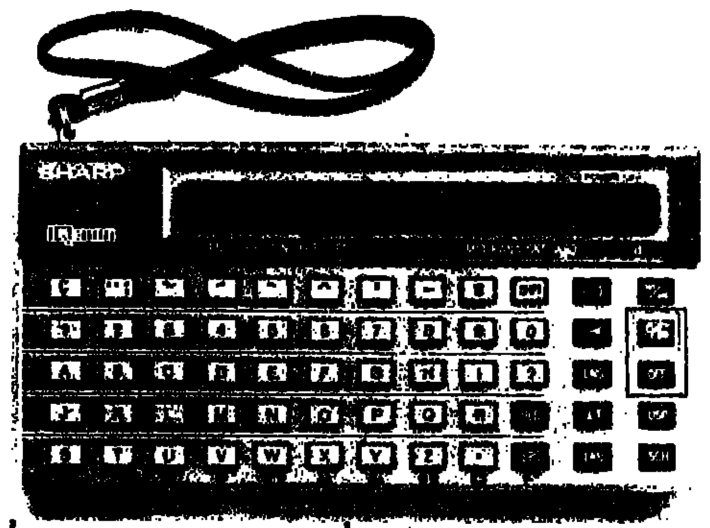
The Series 35 can accept microcassettes from the Typecorder, as can Sony's existing dictating machines when the Typecorder is being used for voice.

It is the portable Typecorder which can be carried in a briefcase, which Sony US vice-president for office products Bob Meriani describes himself as "most excited about".

It looks remarkably like the hypothetical Dynabook which was thought up at Xerox's Pal Alto Research Centre in the early '70s, although that was to have half-page screen rather than a single-line.

The technology for such a thin screen does not yet exist, but the idea of a portable "information resource" is still highly regarded.

The Microwriter (CW, November 13, 1980) now costs £485 and has attracted quite a following in the UK. Its chord keyboard is intended to be easy to use but inevitably the Qwerty keyboard has the advantage of being firmly established.



THREE business aids have been introduced by Sharp Electronics. They are the IQ100 translator, the EL6200 calculator and the PC1211 programmable computer.

The translator (pictured above) is about the same size as a calculator, and translates English, German, French, Spanish and Japanese. The calculator incorporates a clock/calendar, four key memory and alarm. The pocket computer uses Basic language and has a memory capacity of 1424 steps and 26 separate memories.

Sharp Electronics (UK) (CW), Sharp House, Thorp Road, Manchester, M10 9BE.

LSI-11 and PDP-11 families converge

AN ENCLOSURE which converges families of DEC LSI-11 and PDP-11 minicomputers has been introduced by Transduction of Canada.

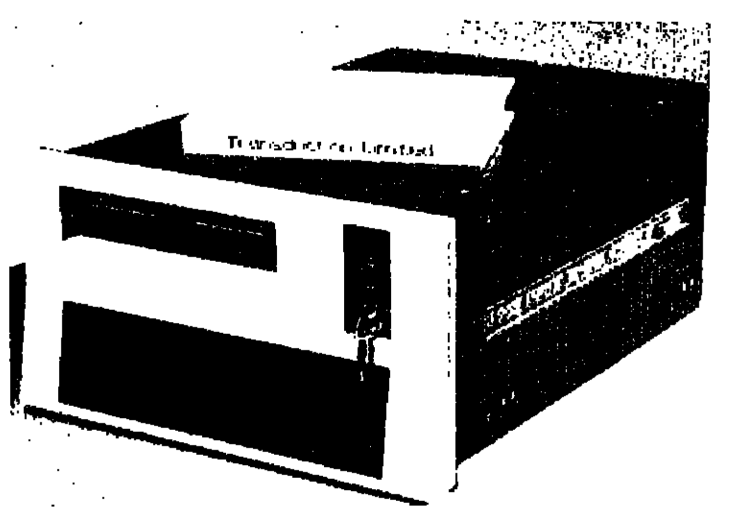
Called the Superblue/11, it has an optional dual purpose bus converter kit (Q-bus to Unibus or Unibus to Q-bus) and dual drive DECtape II cartridge assembly.

Switching power supplies provide 50A at +5VDC, 6A at +12VDC, 1A at −12VDC, 6A at +15VDC and 1A at −15VDC to service both LSI-11 and PDP-11 CPU, memories and controllers.

The enclosure's front panel lighted push-button controls include Halt switch, Run Switch and Line Time Clock switch, with printed circuit board circuitry connected via ribbon cable to the LSI-11 backplane assembly. The control printed circuit board also has an AC power-up sequencing circuit and key-lock DC power on-/off switch to lock out front panel controls for security.

The basic model costs $2,650 or $7,000 with all options installed.

Transduction Ltd (CW), 1645-11 Sismet Rd, Mississauga, Canada L4W 1Z3.



The Superblue/11 enclosure from Transduction

Lab power supplies

A SERIES of laboratory power supplies is available from Powerline. Called the Lab Series, it comprises single, two, three and four output models.

The single output models (there are five) have separate current and voltage meters, and LED mode indication. The two and four output models have separate meters for the fully floating isolated outputs, switched to read voltage or current. The three output model has a meter to monitor its output. It has two rails of 0-20 Volts at .5 Amperes Constant Voltage or Constant Current.

All models in the series have a digital panel meter option. The operation temperature range is 0 to 50°C.

Prices start at £99.

Powerline Electronics (CW), 5 Nimrod Way, Elgar Road, Reading RG2 0EB. Tel: (0734) 868567.

Selection guide

THE Military Designers' Semiconductor Selection Guide (MDG-100B) is available free from Unitrode. It incorporates ratings and specifications as well as package information for all lines of discrete semiconductor products manufactured by Unitrode.

Unitrode Corp (CW), 5 Forbes Road, Lexington, Massachusetts

Colour hard copy

A FAMILY of colour hard copy output units is available from Sintrom Electronics. The system, called Videoprint, captures the video signal before it is displayed, transforming it into photographic media. It is claimed that in doing this it eliminates off-the-screen photography problems such as distortion, loss of colour fidelity and absense of consistency.

Inputs to the unit can be either RGB signals meeting the RS-170 standard, or PAL video signals.

The Videoprint 3000 system is designed to work with personal computers and low graphics display systems. It costs from £1,500 to £2,100. The Videoprint 5000 system, for use with raster graphic systems costs from £3,100 to £3,600.

Sintrom Electronics, 14 Arkwright Road, Reading, Berkshire.

Adjustable modem housings

A RANGE of adjustable modem housings has been introduced by Data Efficiency. The units, made of sheet steel, are available in three sizes: small, 45 inches high; medium, 61 inches high; and tall, 77 inches high. Each has a 24 inch base.

All units may be supplied with either fixed or roll-out shelves which can be adjusted to accommodate varying numbers and sizes of modems. An optional right hand half door is available.

Electrics are housed in the base of the unit with the isolator to the rear centre. A six switched socket for the modems is standard, but an optional six switched socket is available for further capacity. Two sockets for use by maintenance engineers are positioned at the base of the housing.

Prices start from about £300.

Data Efficiency (CW), Maxted Road, Maylands Avenue, Hemel Hempstead HP2 7LE. Tel: Hemel Hempstead (0442) 57137.

Double-sided

A DOUBLE-SIDED 5.25 inch flexible disc drive, designed for OEMs, has been announced by Control Data.

Called the CDC 9409, it features full industry compatibility and unformatted data storage capacities of 218.8K bytes (single density) or 437.5K bytes (double density). The unit is designed for use in applications such as key entry, point-of-sale and data collection, and with word processing small business and personal computer systems.

Head positioning is accomplished by a band stepper mechanism. The unit does not require electrical adjustments or preventive maintenance during its estimated five-year service life.

It costs $225 in large quantities.

Control Data (CW), Control Data House, 179/199 Shaftesbury Avenue, London WC2H 8AR. Tel: (01-240) 3400.

Page reader

AN OCR page reader, designated the TOCR is available from OCR ScanData. Manufactured by CDC, it reads alphanumeric OCR-A or OCR-B. and numeric handprint data.

The TOCR can be used in five modes: as an OCR stand-alone data capture device, an OCR input to an intelligent terminal, an OCR remote input device to a central computer or communications system, or as an OCR peripheral to a key-to-disc system.

The price to an end user is about £25,000.

OCR ScanData (CW), 7th floor, Queens House, 2 Holly Road, Twickenham TW1 4EW. Tel: (01-891) 0156.

Hotel accounting system

A FREE-STANDING programmable guest accounting system is now available from NCR. Called the NCR 2251, it is claimed to simplify posting procedures, produce easy-to-read guest accounts and enforce strict transaction control in hotels of 50-200 bedrooms.

This electronic model replaces the electro-mechanical NCR 42. It occupies the same desk space and uses the same guest folio forms.

The system has a non-volatile memory and its printing capabilities include a 40-column single dot matrix printer for validation and journal printing, and a 90-column matrix printer for the guest's folios.

The keyboard comprises 10 captioned fixed function keys, including three receptionist keys and 22 fully programmable keys. Any two keys can have up to 10 distribution totals and may be either debit department or settlement keys. VAT and service charges may be automatically calculated as an option.

It costs £3,450 plus program charges.

NCR (CW), 206 Marylebone Road, London NW1 6LY. Tel: (01-388) 8248.

Portable micros

A MICROCOMPUTER based on the Z80 microprocessor has been introduced by Portable Microsystems. Called the DTC 80, it comes in two versions. The DTC 80-2 is supplied with a 2K system monitor, 8K basic in ROM, full graphics in ROM, and a solid state qwerty keyboard. The model is designed around the Nascom 2 microcomputer.

The DTC 80-1 starts at £295 + VAT, and the DTC 80-2 starts at £395 + VAT.

Portable Microsystems (CW), 18 Market Place, Brackley, Northants NN13 5NJ. Tel: (0280) 702017.

marketplace

Appointments Appointments Appointments

THE NEWSPAPER COMPUTER PEOPLE RELY ON

COMPUTER WEEKLY

Classified Department, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS

Box Numbers Should be addressed to the box number in the advertisement c/o Computer Weekly at the above address

Classified Rates. £19 per scc
19 x 3 cols = £872 39 x 3 cols = £1,470
Half Page (19 x 7 cols) = £1,530
39 x 4 cols = £1,792
Full Page (39 x 7 cols) = £2,900

Copy Deadline 3.30 pm Monday prior Thursday publication date. Complete artwork up to 11 am Tuesday. Advanced space reservation is advisable

LONDON 01-661 0121 (8 lines)
Chris Prior Assistant Classified Manager
Ken Warford Classified Supervisor
Neil McDonnell Consultancies
Ian Faux Consultancies
Julie Hannaford Consultancies
Denise Smith General Appointments
Gillian Johnson General Appointments
Kevin McOwan General Appointments
Peter Hegis General Appointments

MANCHESTER-GLASGOW
Owen Kelly 061 872 8861
Geoff Aiken 061 872 8861

BIRMINGHAM-BRISTOL
Vic Shore 021 356 4838

Classified Production 01-661 3500 Ext 3104 Steve Lever

نقلا عن الأصل

MYRIAD

INTERNATIONAL DATA NETWORKS COMMUNICATIONS ENGINEERS

£7,000-£10,000
READING BASE

Due to the increasing importance and continuing growth of the data communications industry we are seeking additional engineers to join the Product Engineering Group of the industry's market leader. The company is experiencing ever-increasing demand for its sophisticated range of data communications products and is therefore expanding its engineering and support groups to cope with significantly increased workload.

The Product Engineering Group provides a high-level technical support service to users throughout Europe. This includes the provision of a consultancy service on network design and application, system specification and costing, monitoring new development in the market and training users.

The general requirement is for candidates who are educated to degree level in either Electronics, Physics or Computer Science with post-graduate experience in either data-communications technology, digital electronics or micro-processor application.

Dealing with prospects and users throughout Europe a degree of international travel will be involved and the ability to work without immediate supervision is therefore important. The company can offer extremely bright prospects for future career development coupled to a high commencing salary and valuable conditions of employment including comprehensive relocation assistance. Telephone to discuss these opportunities in detail or alternatively write to us quoting reference SW1/0801/CW.

MYRIAD APPOINTMENTS LIMITED
30 Fleet Street London EC4Y 1AA Telephone 01-353 0981 24 hours

(3805)

Faculty of Business — Barking Precinct, Dagenham, Essex
Department of Systems and Computing Studies

Lecturer II/Senior Lecturer in Systems Analysis and Design

Applicants for this post should have recent commercial or industrial experience in systems analysis and design and will be required to help develop and to teach on a range of computing courses up to and including degree level. An involvement in the industrial placement of sandwich students will also be expected.

The salary for this post will be:
Lecturer II — on a scale from £8,012 per annum to £9,702 per annum plus £759 Inner London Weighting Allowance.
Senior Lecturer — on a scale from £9,962 per annum to £11,295 per annum plus £759 Inner London Weighting Allowance.

Interested persons are invited to write for further details and an application form from the under-mentioned address quoting reference number B1/1/80.

The Polytechnic Personnel Office (2), North East London Polytechnic, Asta House, 156/164 High Road, Chadwell Heath, Romford, Essex RM6 6LX.
Closing date: 23rd January, 1981.

(3919)

NELP North East London Polytechnic

OPERATORS

CROYDON

urgently required 2 Operators to work on a PDP11. Previous experience would be advantageous but not essential.

The company, a well-known bank, offers an excellent benefits package including mortgage facilities.

Please contact Sylvia Day (3882)

FORCE 8
Computer services
8 Mint Walk, Croydon. 01-680 3761

Operations Controller

Tax-Free Salary **Bahrain**

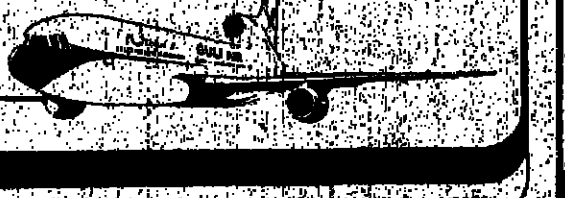
Gulf Air, the prestigious national airline of the Gulf States, has a rewarding opening for an Operations Controller at a busy, modern computer centre in Bahrain.

The successful applicant will be responsible for directing the scheduling and operation of all production activities associated with computer processing. This will include the review of equipment, personnel performance and new applications, and you will also be required to provide technical advice to management.

The person we seek will have had substantial computing experience, much of which should have been in senior operational positions using IBM 360/370 equipment running under DOS.

In addition to an attractive tax-free salary, this married-accompanied or single status appointment offers all the benefits of a successful international airline including passage-paid UK leave, free accommodation and medical cover.

To apply, write with a full c.v. quoting Ref. OC to Personnel Controller UK and Europe, Gulf Air, Room 252, Excelsior Hotel, Bath Road, West Drayton, Middx.



طيران الخليج
GULF AIR

(3938)

IBM TP CONSULTANT

Wiltshire

Contract or permanent assignment to act in both a practical and advisory capacity to our client developing major new systems. Sound knowledge of IBM Assembler, TP technology and SNA and an appreciation of IMS is a requirement.

Contact: R. Carr on St. Albans (0727) 34391 (24-hr. ansafone).

Fraser Williams (London) Ltd., 3a Canberra House, 17-19 London Road, St. Albans, Herts.
or contact Ian Gold on 01-388 0036

Fraser Williams Computer Consultants

LONDON, ST. ALBANS, LIVERPOOL, LEEDS, MANCHESTER, POYNTON, BIRMINGHAM, BRISTOL, SHEFFIELD, GLASGOW, TORONTO, NEW JERSEY

RECRUITMENT KINGSTON £££

We are an expanding Recruitment Consultancy currently operating from 3 UK centres and urgently seek an ambitious person interested in recruitment as a consultant for an expanding DP market.

You will work initially with a senior consultant in our Kingston office and receive the full training that only a professional organisation can offer. (The rest is up to you!)

You will easily increase your present income if you are determined and have experience in the DP field.

Telephone Alan Sanders for an interview today. (3984)

01-549 6441 AB EXECUTIVE

Sales Engineers Graphics

c. £18k per annum

(open ended)
Guarantee for first 12 months
+ Company Car

NORTH HOME COUNTIES AND NORTH EAST ENGLAND

We are one of Britain's leading high technology Manufacturers within the graphics industry. As part of a successful and progressive British Group of Companies we manufacture a wide range of highly acceptable and marketable products that are extensively supported.

Expansion

In 1981 we have planned to expand faster than the forcasted 40% growth in the graphics industry. However, to do this we need to further enhance our sales coverage in the United Kingdom.

The best qualified for the positions are those people who are successfully selling the more technical products, ideally within the graphics industry where a good understanding of end user applications should be evident. An engineering or computer bias would be a distinct advantage.

Structured Training

The Company offers a structured training programme that continues throughout the career; and when we say career, we mean it. Opportunities are good with possibilities extending to Europe.

If you are looking for a challenge and a chance to contribute towards the future of our Company for an immediate and confidential interview contact our Advising Consultant,
SIMON LEVER, for the Southern area
ON 01-935 0671 (24 hour answering service)
OR 021-420 1574 (evenings and weekends).

For the Northern position contact PAUL PEARCE
ON 061-833 0427 (24 hour answering service)
OR 021-308 4908 (evenings and weekends).

SCR

London 01-935 0671 3 Mandeville Place, Wigmore Street, London W1M 5LB
Birmingham 021-236 3781 35-37 Great Charles Street, Queensway, Birmingham B3 3JY
Manchester 061-833 0427 Blackfriars House, The Parsonage, Manchester M3 2JA
Brussels 010 322-640 7151/71 Avenue Louise 327, Boite 4, 1050 Bruxelles

Specialist Computer Recruitment Ltd

Computing Services Association

Computer Professional Recruitment Consultancy

NEW YEAR OPPORTUNITIES

R23 **TOP CLASS MINI SALESMEN**
Circa £21k, on quota LONDON, MIDLANDS, NORTH

COMPANY Dynamic, successful OEM. Planned expansion in above areas. Commercial/Shop-Floor/Word Processing systems. Top grade 'Kit.'

NEEDS First class professional salesmen. Exciting lucrative territories — above average packages for real talent. Some management positions available for expert man-managers. 'Quota-Busters' only.

R24 **DATA COMMUNICATIONS SALESMEN**
£9k BASE — NO TOP LIMIT. MANCHESTER

COMPANY World-wide market leader. Exciting products. Dynamic management and growth. New products in pipeline.

NEEDS First class salesmen 25-35 years of age. Preferably able to sell to communications design engineers. Will consider outstandingly successful commercial systems hardware salesmen.

R25 **MINI/MICRO ENGINEERS**
£s NEGOTIABLE. BASED U.K. WIDE

COMPANY OEM market leader. Dynamic growth — excellent 'kit', exciting new products. Advancement prospects unlimited.

NEEDS Engineers, mini/micro, field support/development/training. Minimum 2 to 3 years' practical experience. DEC experience useful.

R26 **BUREAU SYSTEMS SALESMEN**
up to £7k BASE up to [illegible] on quota. MANCHESTER

COMPANY Market leader. Commercial, Technical and Scientific systems, excellent back-up services. Exciting prospects.

NEEDS Preferably bureau system sales experience. Certainly good knowledge of commercial data processing sales.

R27 **SALES DIRECTOR DESIGNATE**
Circa £12k + package earnings up to £20k SHEFFIELD

COMPANY Young enterprise. Sound financial base. Products — micro and commercial systems packages. Commodore. [illegible] etc. £1,300,000 p.a. turnover already achieved.

NEEDS Senior Sales Manager looking for opportunity of Directorship. Will be responsible for recruiting sales team and leading from front. Ground-floor opportunity — 'shirt-sleeves' mentality only.

R28 **INSTALLATION SUPERVISOR**
Circa £8K + CAR. SHEFFIELD

Desperately needed for the above company. Must be experienced in commercial systems and client control.

(3940)

Computer Operations Supervisor and Senior Computer Operators

The British Council works overseas in about 80 countries and is engaged in a wide variety of educational and cultural activities. Our ICL 2950 is currently being operated under contract but we are phasing in our own staff. We are looking for a Computer Operations Supervisor and two Senior Computer Operators to work in the ICL building at Putney, where our computer is housed, on our batch processing and on-line applications which run under DME and GEORGE 2+.

The Computer Operations Supervisor will have responsibility for controlling day-to-day operations and supervising Council staff in the computer room and media library. Duties will include scheduling work, liaison with Council departments in central London and with ICL, responsibility for ordering supplies of computer stationery, tapes and discs, liaison with engineering services, maintaining control statistics, and providing holiday and sick leave cover. Applicants should have a good general education and at least two years' experience in computer operations including GEORGE 2+ together with proven ability in technical administration and the supervision of staff. Knowledge of the ICL 2950 operating under DME, communications or systems software would be an advantage. Starting salary is £7966 rising to £9571. 22 days annual leave plus 2½ privilege days. Non-contributory pension scheme.

The Senior Computer Operators (2 posts) will act as shift leaders, each shift consisting of one senior and one junior operator. The senior operator will be responsible for running the work of the shift and will share operating duties with the junior operator including controlling the 2950 through its VDU console, loading computer peripherals and general maintenance of the computer hardware and software. Applicants should have a good general education and previous experience as a computer operator. They should be capable of working under minimum supervision and should be good at dealing with all levels of staff. Experience of ICL software and hardware, knowledge of GEORGE 2+ or communications facilities would be an advantage. Applicants should be physically fit. Computer operators normally work a Monday to Friday 2-shift system (0800-1600 and 1200-2000 hours) alternating shifts weekly. Starting salary is £5916 at age 20 or over, rising to £7761. Proficiency payments are payable following one year's satisfactory performance in the post. 20 days annual leave plus 2½ privilege days. Non-contributory pension scheme.

For further details and an application form, to be returned by 30 January 1981, telephone or write quoting DP/1 to:

Staff Recruitment Department,
THE BRITISH COUNCIL
10 Spring Gardens, London SW1A 2BN. Tel: 01-930 8466 ext 2531 or 2544.

MODUS

International Personnel Consultants
Modus Management Services Limited
148 Watling Street, Radlett, Herts. WD7 7JH
Telephone: Radlett (09276) 3077

New Technology is just History in this Company

Our client is one of the largest independent software and systems services companies in the world — a company which has a long history of involvement in some of the most innovative and important systems ever developed.
Indeed, some of the British company's achievements are well known both inside and outside of the computer industry, providing benchmarks for successive development projects undertaken by other organisations.

Guaranteed Growth

The increase in business now concluded for 1981 and beyond, is in stark contrast to the lack of growth currently being experienced by some areas of the computer services industry. The immediate result is that the number of professional staff will be substantially increased, since the new business will provide on-going project work for successful candidates.

Career Prospects

In view of the growth factor and the way in which our clients assign staff to project work, there is no doubt that there will be progressively more room for extremely senior consultancy and project management positions as time passes. Additionally, our clients approach to project control and system design is entirely modern and exposure to these methodologies is certain to enhance and increase individual professional capabilities.

Salaries £10,500-£13,500 range, although a few more senior positions are available. Naturally, additional benefits such as a pension scheme, free BUPA, interest free season ticket loans etc also apply.

Location The Company H.Q. is in the West End of London, so although most appointees may be working on site in the N.W. Home Counties for most of the time all candidates must be prepared to work in London. Full relocation expenses will be available if necessary.

Systems Analysts

These positions equate more readily to "Senior Analysts" positions in general and would therefore be suitable either for individuals already at Senior Analyst level looking for a move to consultancy work or for individuals who feel they are ready for promotion.

- Essential expertise must be thorough experience of establishing and defining user requirements.
- First-class communicative skills, both oral and written, will naturally be expected from all candidates.
- Knowledge of modern analytical methods, such as data analysis, would be a major asset although not a pre-requisite.
- Machine and software backgrounds are not relevant at this stage but experience of on-line systems is absolutely essential — preferably for large multi-user and multi-site systems.

Systems Designers

(incl. Comms & Software)

A broad range of skill requirements exists within various design teams, providing opportunities both for designers with a leaning towards software and for Analyst/Programmers who have not moved into pure analysis roles.
The technical areas of particular interest are:-

- Communications Systems Design — including message switching, voice network, traffic pattern and work load pattern establishment etc.
- Software Design and Programming — development work on both operating systems and communications interfaces.
- On-line Systems Design — experience of man/machine interfacing and terminal based systems is essential.
- Database and DBMS Design — knowledge of how a vast amount of information can be structured, processed and distributed.

Contact:- Andy Wright or Mike Creamer

هكذا من الأصل

DEPARTMENT OF FINANCE

COMPUTER SHIFT LEADER

Grade T3/4
Salary £5,178-£6,537 plus 14% shift allowance

The council currently operates an I.C.L. 1902T computer running under George 2+ with several on-line applications.

A Honeywell L54/DPS 2 is due for delivery in 1981 as a replacement for the 1902T.

The successful applicant will be expected to play a substantial role in the transfer of work from the present equipment to Honeywell installation and a knowledge of the G.C.O.S. operating system is desirable.

Applicants must have at least two years' operating experience and be capable of accepting high levels of responsibility during the alternating shifts.

Application forms available from the Chief Personnel Officer, Civic Centre, Millgate, Wigan. Tel. Wigan 44991, ext. 43. Closing date: January 23, 1981.

(3971)

Metropolitan Borough of **WIGAN**

OPERATORS

CROYDON

urgently required 2 Operators to work on a PDP11. Previous experience would be advantageous but not essential.

The company, a well-known bank, offers an excellent benefits package including mortgage facilities.

Please contact Sylvia Day ([illegible])

FORCE 8
Computer services
8 Mint Walk, Croydon. 01-680 3761

CONTRACT or PERMANENT
☎ 01-439 3871
HEXAGON
computer services (490)
Hexagon House 145 Wardour Street, London W1V 3TB

THE POLYTECHNIC OF CENTRAL LONDON
Computer Unit

ADVISORY PROGRAMMER

Salary up to £8810

The person appointed will join a small and enthusiastic team supporting systems and applications software on DEC 10 and VAX 11/780 computer systems, and providing advice and documentation for the staff and student users in all schools of the Polytechnic. A degree in a scientific discipline, with programming experience (preferably in Cobol) gained either during or after the degree course is essential.

Closing date: 22nd January, 1981.

Application form and further details from the Establishment Officer, PCL, 309 Regent Street, London W1R 8AL. (Tel: 01-580 2020 ext. 21).

(3919)

IBM OPERATOR

GET ON-LINE TO NEW YORK

To work on an 8100 DPCS on-line to a 3031 Operating under DOS VS Power in New York. As a member of a small team you'll be working in a unit which will grow dramatically over the next two years — with all that could mean for your own career. IBM trained and with at least one years experience you'll have a knowledge of RJE and be technically orientated.

Starting salary £6,500 together with LV's and season ticket loan.

Looking for more opportunity — this could be it.

Contact Mrs. P. Taylor Personnel Manager,
Leslie & Godwin Limited,
Dunster House, Mark Lane, London EC3R 7AD
Tel: 01-623 [illegible]

3939

Leslie & Godwin Ltd

Sales Professionals

Upgrade to the world's most advanced data communications systems

UK-wide
c.£16,000 + car

Data Communications is one of the fastest growing sectors in industry today. The world's most advanced and comprehensive range of equipment is made and sold by our client. Rapid expansion in the UK creates some of the most exciting sales opportunities in Britain.

Additional Sales Executives are needed in most parts of England and Scotland to advise customers on their requirements and to sell solutions which can take any form from additions to existing networks to the total design and implementation of systems.

The company is noted for its technical excellence and product reliability. Its reputation is unrivalled. Some of the best names in world industry and commerce feature on its customer list and market demand is increasing.

If you are aged 25-35 and have a record of achievement . . .

- — selling to the electronics or DP sectors
- — selling sophisticated office equipment
- — selling technically advanced instrumentation or similar products

. . . get in touch and share in this success.

While a good educational background in electrical/electronic engineering will be an advantage, comprehensive technical and product training can be given to those without formal qualifications.

There are opportunities at various levels and for the senior posts a high basic salary and target-related commission means earnings in excess of £16,000 are entirely realistic. Additional benefits include a company car and relocation assistance where appropriate.

Whether selling to small businesses or negotiating at top level with major corporations you will enjoy the highest standards of technical support and excellent opportunities for advancement.

If you're ready to upgrade to a major force in this fast growing area telephone Bob Anthony on 01-235 6060 between 9.30 — 6.00 on Thursday 8th January, Friday 9th January and Monday 12th January. Alternatively write to him quoting ref: W4992/CW with full details at:

PA Advertising, Hyde Park House,
60a Knightsbridge, London SW1X.
If there are any companies to
which your details may not
be sent, please list them
in a covering letter.

PA

(3947)

HOLLAND MINIS

Assembler Programmers and Analysts with mini and micro experience (minimum 3 yrs.) required by Dutch Systems House for scientific/technical projects — DEC, DG, Intel, TI of particular interest. Generous relocation allowances.

£12-15K

HERTS MICROS

Analyst/Programmers with Assembler and Basic on small minis or micros (particularly Intel or Texas Instrument) needed by Manufacturer of intelligent terminals and emulators. Excellent prospects due to rapid growth of the company.

to £9K

MIDDX COBOL

Programmers and Analysts with COBOL experience and, ideally, some knowledge of structured programming techniques required to meet expansion plans for development centre of leading Manufacturer. Degree preferred.

£7-11K

COBOL CHESHIRE

Programmers (min. 2 yrs.), Analysts, Designers and Team Leaders with COBOL experience required for major new projects being undertaken by Northern Branch of leading British Software House. Applications include order processing and pension management funds. Relocation offered where appropriate.

£6.5-10K

FINANCIAL SYSTEMS

Consultants, Analysts and Programmers with minimum 2 years' practical experience in financial/commercial systems — programming involvement essential — urgently required to meet new year expansion plans of leading Financial Systems House. Driving licence necessary, excellent promotion prospects.

to £13K

ICL

Designers/Implementors with solid real-time, on-line experience on large mainframes (pref. ICL 2900+), preferably with some networking/comms experience, required for implementation of major command and control systems — base in NW London.

£10-13.5K

CONSULTANTS

Senior Consultants and Managers with wide applications knowledge and experience in client liaison, proposal writing, interpretation of tender documents etc. required for London office of International Systems Group.

to £14K

MICROS BERKS

Software Engineers (One Group Leader) with in-depth knowledge of the application of real-time operating systems using micros needed by UK market leader in environmental controls. Location is in Berkshire.

to £12K

REAL TIME MINIS

Consultants, Designers, Analysts & Programmers needed to join Hants-based teams working for leading UK Systems & Software House on military and communication projects. At least 3 years' experience in real time systems, CORAL on PDP 11, DG Nova, Ferranti or GEC desirable.

£8-12K

MILITARY COMMS

Analysts and Programmers (graduates with 3-5 yrs. in TP or on-line environment) required for new networking/comms project. Particular experience sought by our client: military, user definitions, access controls, networking, message switching etc. Project teams will be based on site in Bucks.

£8.5-13.5K

(3957)

MATRIX

D.O.E. Lic No. SE(A)4127

10 Grenville Place
London SW7 4RW
01 373 3063
to 8.30pm 7 days a week

FOR CONTRACT VACANCIES

PROGRAMMERS

BASIC: Commercial applications and program maintenance **Sussex**

BASIC AND FORTRAN: Micro business systems and instrumentation control **Surrey**

COBOL: TI 990/10 Insurance **London**

PL/1: MACRO: JCL: Conversion OS to DOS for specific packages **Surrey**

PASCAL: Commercial **Bracknell**

JACKSON COBOL: Burroughs 6800: Database **Surrey**

COBOL: ICL 1900 SERIES: Insurance **Surrey**

COBOL: IBM 43/41: DOS/VS: Insurance **Surrey**

Applicants should contact
Anna Morris quoting Ref. No. C810

White & Nunn

Why not enquire
about our other vacancies?

(3920)

White & Nunn Personnel Services Limited Unit 4, Station Approach, Fleet, Hants. GU13 8QY Tel: 02514 28539

LIVERPOOL POLYTECHNIC
MERSEYSIDE SCHOOLS COMPUTING CENTRE

LECTURER/SENIOR LECTURER IN COMPUTER STUDIES

£6,012-£11,295

Candidates should possess a good honours degree or post-graduate qualification in Computer Science and should offer specialism in at least two of the following areas:

1. System analysis and design
2. Computer systems
3. Systems programming
4. Applications programming
5. Commercial data processing

The successful applicant will be required to contribute to the development of advanced and in-service courses for teachers at the Centre.

Informal enquiries to the Centre, will be welcome.
Tel. No. 051-207 3581 (Mrs. S. Evans).
PLEASE QUOTE REFERENCE No. LR/487.
Closing date is 14 days from the appearance of this advertisement.
Application forms and further particulars from the Personnel Office, 2 Rodney Street, Liverpool L1 2UA, Tel: 708 6620 Ext. 43.

(3952)

CONTRACT? RING 01-439 3671 HEXAGON

BOX Nos.

Box number replies should be addressed to:

Box No.
c/o Computer Weekly
Dorset House
Stamford Street
London SE1 9LU

Charles of the Ritz

ANALYST/ PROGRAMMER

Due to increasing demand for computer systems we shall shortly be placing an order for a new mainframe computer. We require an Analyst/Programmer to help initially in the transition from our present IMOS I NCR 8250 and subsequently to develop new systems. Full training will be given. Promotion prospects are excellent in this fast growing company and the rewards match the company's increasing reliance upon the computer department.

Commencing salary will be circa £7000 p.a. together with 4 weeks' paid annual leave. Salary will be reviewed 3 months after completion of training and annually thereafter. After 12 months the successful applicant will be invited to join our non-contributory pension scheme with free life assurance.

Applicants must have a minimum of 2 years' Cobol experience. Knowledge of systems analysis, RPG II, JCL and computer operations would be added advantages.

Applicants should send curriculum vitae to the Personnel Manageress, Charles of the Ritz Ltd., Victoria Road, Burgess Hill, W. Sussex, or telephone Burgess Hill (04446) 6998 for an application form.

Relocation expenses will be paid where applicable.

THORBAR
A DIVISION OF INBUCON MANAGEMENT CONSULTANTS LIMITED

CENTRAL LONDON

HEAD OF U.K. DATA PROCESSING V. CIRCA £15,000 P.A.

New System 34 installation with data communication to U.S.A.

Our clients are a subsidiary of an international group with substantial interests in energy resources, North Sea exploration and development activities operating in the UK, Europe, Middle East and North Africa.

A system 34 will be installed in January 1981. Initially the applications will have a financial and commercial bias using on-line facilities where applicable.

We require to identify a person to head this facility in London who must meet the majority of following requirements:

1. Experience in designing and implementing commercially orientated DP systems
2. System 34 or similar level of hardware experience
3. A COBOL programming background having progressed through to project management status
4. Good systems analysis skills and the ability to implement complex systems requirements
5. Self motivation as well as the ability to relate well with user personnel and management
6. Aged around 25/35 years and possessing an attractive level of academic achievement

Our clients have asked for a final short list of candidates before the end of January so contact us now via the telephone (24-hour answering service) or write to us immediately to arrange an initial interview.

REF: CW/3/81

INBUCON MANAGEMENT CONSULTANTS LIMITED
D.P. Appointments & Contract Personnel,
Greenock House, 19 Cuckfield Road, Hurstpierpoint,
Sussex BN6 9RP. Telephone: Hurstpierpoint (0273) 833848.

(3936)

INBUCON

هكذا من الأصل

SCIENTIFIC PROGRAMMING WITH A DIFFERENCE

This is something different; an opportunity for two young computer scientists to join a small, friendly group of professionals to help determine the most effective use of computer technology in all areas of pharmaceutical research. Our main requirements are for:

SYSTEMS DESIGNER (REMUNERATION UP TO £13,200)

To design and implement systems from feasibility through to user acceptance. You will be involved in all aspects of scientific programming; from interactive graphics to data base management.

SOFTWARE SPECIALIST (REMUNERATION UP TO £10,250)

To be responsible for the design and implementation of software in the different fields of science engaged mainly in data storage and retrieval; automated data collection using micro processors and office automation.

If you have some of the following skills we would like to hear from you.

- ★ **4 or more years in technical D.P.**
- ★ **A degree in Computer or Applied Science**
- ★ **Fluency in FORTRAN**
- ★ **Experience in designing and implementation of large application systems using DB techniques**
- ★ **A real interest in design and implementation of integrated data organisations**
- ★ **A proven ability as a Project Leader to effectively relate to users' requirements through skills of enquiry and communication**

Our client, **Pfizer Central Research**, is at **Sandwich**, a pleasant coastal/rural part of East Kent, within easy reach of the continent and in an area with first-class social/recreational Facilities. Housing is less expensive than in most other parts of the South-East, and the journey to work on uncrowded roads is a pleasure in itself!

In addition to excellent career prospects there are:

- ★ **Excellent bonus, pension scheme and life assurance schemes**
- ★ **All removal expenses paid including legal and agents' fees**
- ★ **Flexible working hours**
- ★ **Subsidised transport and restaurant**
- ★ **An active sports and social club**

Interested, then contact . . .

TUNBRIDGE WELLS 35712/3 (0892) (24 HOUR SERVICE)

COMPUTANT LIMITED
RECRUITMENT AGENCY
14 MOUNT PLEASANT TUNBRIDGE WELLS KENT
TELEPHONE: TUNBRIDGE WELLS 35712/3/4

SALES ENGINEERS

Simulation and computer graphics systems

Sales engineers are needed now to meet the growing demand for one of the most exciting product ranges in Europe. R & H specialises in simulation systems and computer graphics; manufactures Applied Dynamics computers in the USA; has Europe-wide franchises for Vector General, Genisco, Comdyna, Datawest, IGS and other big names.

The UK company is based at Worthing but sales engineers are required throughout the U.K. To apply, you must have experience of either simulation; CAD; or graphics. Salary and benefits are highly competitive. The opportunities for future growth excellent.

To get your copy of the application form together with company background write to van Rietschoten & Houwens (UK) Ltd, Crescent House, Crescent Road, Worthing, West Sussex BN11 1RS.
Tel: Worthing (0903) 206096

(3812)

R+H

Look Where You Can Go With
REAL TIME MINI

Beds. (the county, that is), Dorset, Hants, Herts, London, Surrey, Wilts. And most of the out-of-town employers/users, software houses, computer manufacturers alike — would be happy to cough up relocation expenses, as necessary.

For whom? For anyone with two years' + experience (any level) in Real Time Mini or Micro. Especially SOFTWARE ENGINEERS, SYSTEMS PROGRAMMERS, PROGRAMMERS, PROJECT LEADERS/MANAGERS, LECTURERS (Micro only), TECHNICAL AUTHORS and PROJECT ENGINEERS (Hardware and Software). Languages: Coral, Algol, Pascal, Assembly-Level.

Systems: Any Real Time Mini/Micro, but experience on DEC, RSX11 or INTEL 88 particularly welcome.

Applications: **Military Systems** (including radar, command and control, flight simulation). **Industrial Systems** (process control, production control, Plan monitoring etc). **Real Time Operating Systems, Compilers and Language Processors, Networking, Message/Packet Switching** — and many others.

Salaries: £6½K-14K, some even higher. Depends what you've done, where you've been.

Look where you can go. Dial either number below. Ask for Beryl McLaren. Day or Night, she'll answer personally.

Jupiter
Computer Appointments
(REAL TIME MINIS PLACE)
Suite [illegible]
12-13 Henrietta Street
London, WC2. Tel. 01-836 [illegible]
or 01-836 [illegible]

OR MAYBE FATE HAS A SWISS ROLE FOR YOU!

System "X" — type software people, all levels, are wanted by international manufacturer in Switzerland. Permanent positions. German speaking helpful but not essential.

COMPUTER OPERATOR

Up to £6,477 + 14% Shift Allowance.

This appointment offers considerable scope for career advancement because our policy is to value good ideas from any member of our young, dynamic team. As a member of that team you would be based at the Computer Centre at Bridgend, Mid Glamorgan.

We are seeking an experienced Computer Operator with good operational knowledge of ICL Operating Systems, preferably George 3, and ideally with control operation of a terminal network.

The mainframe is based upon "twin" ICL 2960 machines and associated peripherals which it is planned to "dual" during 1981. The equipment services a large terminal network throughout Wales.

Further particulars and application form are available from the Assistant Personnel Officer, Welsh Water Authority, Cambrian Way, Brecon, Powys LD3 7HP. Telephone Brecon (0874) 3181.

WELSH WATER AUTHORITY
AWDURDOD DWR CYMRU

When enquiring please quote reference 455. Closing date 23rd January 1981.

(3944)

COMPUTER STANDARDS SUPERVISOR
Oman

Petroleum Development Oman is now a major oil company, producing and exporting 300,000 barrels of crude oil per day with a staff of 3,000.

A vacancy exists now for a Standards Supervisor to provide a complete set of new computer operating and programming standards for the Company. You should have good experience in the development of computing standards and be able to work effectively with all sections of the computer centre and user departments.

P.D.O. offers a short service contract which, initially at least, will be on bachelor status with an excellent remuneration package including free accommodation and medical care.

Please apply with details of your qualifications and experience to:
Shell International Petroleum Company Limited (C6)
PBEL/51, Shell Centre, London, SE1 7NA

(3850)

THE UNIVERSITY OF ADELAIDE
invites applications for appointment as a

LECTURER IN COMPUTER SCIENCE

Candidates should have a higher degree in Computing Science and show evidence of interest and capability in research and teaching and be prepared to undertake supervision of research students.

For teaching purposes, the University is equipped with 3 DEC VAX computers and has a CDC CYBER 173 for research work. The Department has its own PDP 11/40 for research purposes.

SALARY SCALE within the range $A17,739 x 7 — $A23,303 with superannuation.

FURTHER INFORMATION: A potential candidate should seek from the Registrar of the University the following documents:

(i) general Conditions of Appointment, which include particulars of tenure, superannuation, removal expenses, invalidity and study leave, and

(ii) a Statement giving particulars of such matters as help in housing, conference grants and special support for research.

The University will gladly supply any further information desired on request to the Registrar.

APPLICATIONS in duplicate, should give the information listed in the penultimate paragraph of the Statement and should reach the Registrar of the University, G.P.O. Box 498, Adelaide, South Australia, 5001, not later than 16 February.

(3814)

SALES MANAGER
COMPUTER EQUIPMENT

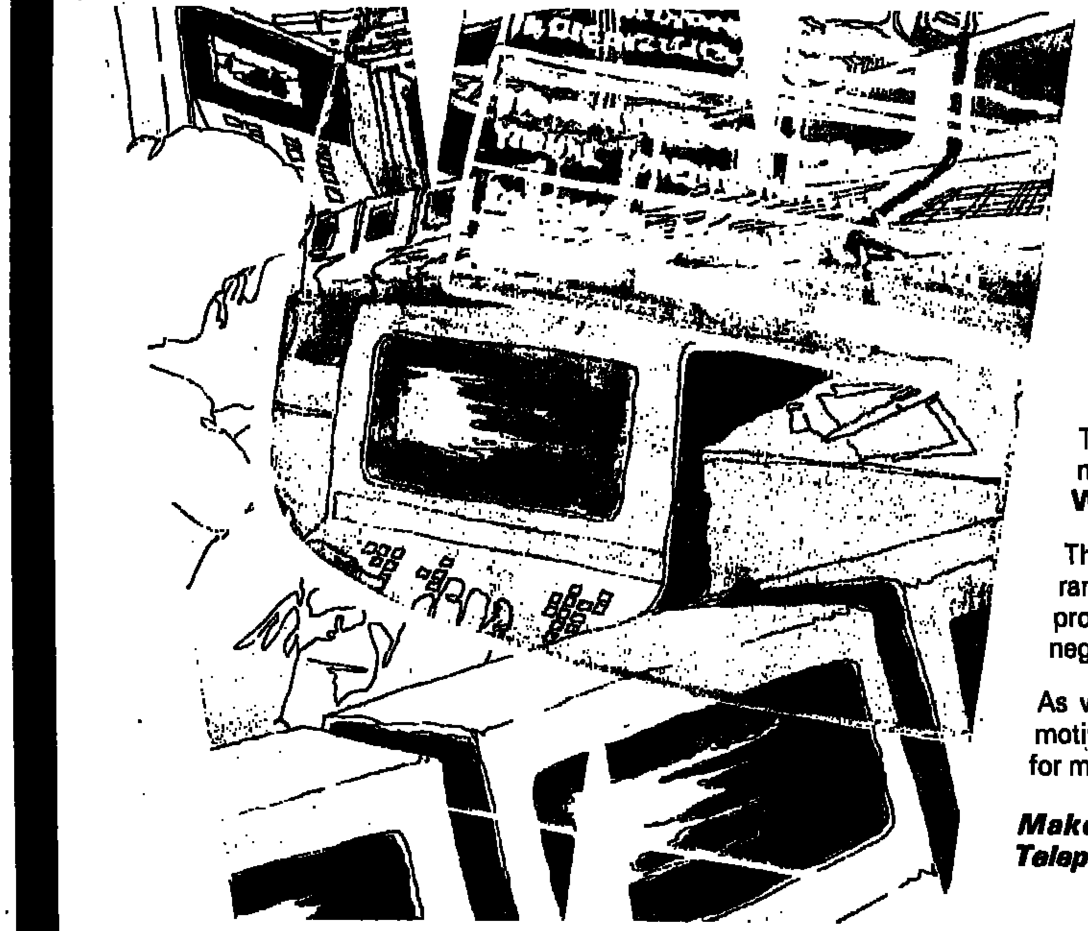
Are you an experienced salesman or woman with the ability to build a direct sales operation from scratch? Do you have an appreciation of microcomputers, printers, terminals and disk and Winchester disk drives, together with a knowledge of COBOL, BASIC or FORTRAN?

Then we would like to hear from you. We are the UK arm of an established international company, importing a range of US-manufactured computer equipment and peripherals, and we need a self-starter aged between 30 and 35 to spearhead further penetration of the UK computer market.

In return we offer an attractive, negotiable salary package and all the benefits you would expect from a vigorous and expanding organisation. If you feel you could meet our needs, write with brief details of career and experience to Box 1121.

MANAGEMENT & EXECUTIVE SELECTION

telephone 01-637 9611



Go west for new name success

OEM DISPLAY TERMINAL SALES. BASED WEST OF LONDON

To £18K + 2-litre Automatic Car

The leading established international manufacturer of Display Terminals has asked us to identify a new business **Sales Manager for West London and the West and North of England.**

This is a new position in a well-developed region selling the complete range of display terminals principally to large OEMs and will require a proven track record in the Display Terminal market and ability to negotiate at Board level.

As well as a good basic salary, the commission plan is geared to motivate the successful sales manager to maximum financial reward for maxium effort.

Make a new name for yourself in Display Terminals — Telephone Ruth Herman on 01-637 9611.

Suite 201/6 Albany House 324 Regent Street London W1R 5AA 01-637 9611

MANAGEMENT & EXECUTIVE SELECTION

(3823)

هكذا من الأصل

CHALLENGING OPPORTUNITIES FOR ANALYST PROGRAMMERS IN PROJECT MANAGEMENT

HANOVER - WEST GERMANY **DM 60,000**

Our client is Preussag AG, one of West Germany's largest group of companies, with a turnover in 1979 of DM 3.2 billion and world-wide business interests ranging from metals through transport and energy to construction.

In the head office, in Hanover, which is an attractive modern city centred on an area rich in forests, lakes and hills they have two IBM 370/158 mainframes and assorted distributed equipment, supported by a very professional EDP team. This needs strengthening by adding one or two Analyst Programmers who after having shown sufficient expertise and with a good command of the German language, should expect to be placed in charge of a project team to handle part of the agreed data processing plan for the diverse companies that constitute Preussag throughout Germany.

They are seeking men or women with at least three to four years' analytical and programming experience in and around the manufacturing areas. The major projects under consideration within this environment cover material planning and inventory control, maintenance and quality control, distribution, disposition of orders and contracts, production planning and shop floor control. You should have experience of the design and implementation of systems within this area; working within allied industries would of course be an added advantage.

In addition you will need current programming experience in COBOL, PL1 or BASIC; a working knowledge of MUMPS on DEC/PDP would be very useful.

To succeed within the project management area, and to communicate with user personnel a working knowledge of German is essential. However, initially a willingness to learn the language coupled with a basic understanding of grammar and vocabulary would be considered sufficient; help in learning the language will be provided.

A good education, initiative to work on your own and proven performance at meeting project deadlines would be additional factors in your favour.

Our client would prefer to hear from single people, of either sex, or married men able, initially to spend time on their own in Germany, as the projects could involve up to 30 per cent of the time away from the Hanover office in localities both nearby in Northern Germany, but also throughout the rest of the country.

Preussag are offering the right applicants from DM 60,000 per annum plus the normal range of fringe benefits associated with joining a big company, including health and pension plan, and up to 30 days statutory holiday per year.

The first interviews will be held in London, and to find out more about the job, the company, Hanover or any additional information please call our consultant Len Griffiths in London on 01-828 5584 or 01-828 5701. Alternatively send full details including telephone numbers for us to contact you to.

(3821)

inter elect
Management Consultants Limited,
11 Catherine Place, London SW1E 6EC. Tel: 01-828 5584/5701

CONSULTANTS ANALYSTS PROGRAMMERS

Croydon London/City

Salaries to £15k

We have been retained by our client, a major international Services Company to help recruit a number of key people at all levels to fill vacancies at their London offices.

All positions require at least 2 years' practical experience of Systems and Programming work. Candidates should have a prime interest in developing systems and solving business problems.

Flexibility is vital as our client mixes programming, systems work and consultancy, therefore using each person's skills to the full.

Successful candidates are expected to participate fully in the development of the company, and as all promotions are from within, candidates should be positively career conscious.

Excellent salaries and attractive benefits are offered by this fast-growing company which include: Share Purchase Scheme; Free Medical Insurance; Free Life Assurance, Free Pension, Profit-Sharing Scheme, Relocation Assistance, as well as influence in company policies.

CW2/1

SYSTEMS DESIGNERS PROJECT LEADERS

North Hertfordshire

We wish to recruit on behalf of an International design and manufacturing company — a market leader in the Process Control Industry.

Our client develops computer systems using their own hardware and software products built around PDP-11 processors.

A real opportunity exists for Systems Designers and Project Leaders to develop packages and products.

Candidates should have the ability either to project teams or design software systems.

If you have been working in: Multi-Tasking; Data Communication Systems; CPU buses and peripherals or Automation Systems, we should like to hear from you.

Excellent salaries and generous relocation assistance are offered plus the usual benefits associated with a company of such high standing.

CW2/3

LONDON: 8a Lower Grosvenor Place, London SW1
Telephone: 01-834 7105. Telex: 918582

DUBLIN: Canberra House, 24 Lower Leeson Street
Dublin 2
Telephone: (0001) 789577

SENIOR PROGRAMMER

Dublin £8,000-£10,000

An established international manufacturing company on the north side of the city requires a competent Programmer who has the ability to advance quickly.

Expertise in RPG II is the main requirement. However, experience of interactive systems, the manufacturing process or database techniques would be helpful for the career that is envisaged for the successful candidate.

Our client will pay a top salary for the right candidate, together with other excellent benefits.

Please contact Joyce Hughes or Gerald Delemare on Dublin (0001) 789577.

CW2/2

PROGRAMMER SYSTEMS/ ANALYST

Dublin £8,500 + Mortgage Assistance

A leading financial institution in Ireland is installing an IBM 4341 in 1981. To complete the development team Programmer/Analysts are required.

Candidates with 5 years in Data Processing are needed, of which at least two should have been using Assembler language, preferably IBM. Additional training in new techniques will be given.

Besides an excellent salary and low cost mortgage, other benefits in this package include a generous pension scheme.

Please contact Joyce Hughes or Gerald Delemare on Dublin (0001) 789577.

CW2/4

Analyst Programmers & PROJECT LEADERS

London Based to £11,000

A London-based European Systems House is seeking Analyst/Programmers and Project Leaders for their diverse operations in the UK, Germany and Holland.

Their business is mainly based on technical projects in the prime industries. Plant Process Control, Designing Minicomputers for the North Sea Oil/Petro Chemical industry; Laboratory Automation; Mechanical Handling; Medical Systems and H.E.P. equipment are examples of their projects.

Our client is interested in candidates who have real-time mini computer experience and have worked on the following software:

DEC	**Data General**
Honeywell	**Intel**
Ferranti	**Philips**

Familiarity with PDP RSX11 is an added advantage, and a knowledge of several high-level languages including ASSEMBLER is necessary for these positions.

Competitive salaries plus generous benefits are offered which includes: Profit Sharing Schemes, Free PPP Medical Insurance, Relocation Assistance, and for the more senior people, a car is also included in this package.

CW2/5

S/34 RPG II PROGRAMMER/ ANALYSTS IN CONSULTANCY

Dublin £7,000-£10,000

Our client is a major Irish accounting and management consultancy practice, employing over 550 people and providing a comprehensive range of professional services to Irish and international companies.

You will be required to work on a variety of Business systems being developed on RPG II for outside clients.

If you have at least 18 months' experience of RPG II, our client will be very interested but if you have 5 years' plus, they still want you and will pay more! IBM System 34 experience is of particular interest.

Successful candidates will be offered a position in line with their experience and a future working to high professional standards in a company committed to individual programmes for training and development.

Please contact Joyce Hughes or Gerald Delemare on Dublin (0001) 789577.

CW2/8

SENIOR SYSTEMS ANALYST ANALYST/ PROGRAMMER

Dublin

Senior Systems Analyst
£10,500-£11,500 + Bonus
Systems Analyst/ Programmer
£9,000-£10,000 + Bonus

Our client, a market leader with a turnover of just under £100m, requires additional Data Processing personnel for major developments over the next 4-5 years.

The Senior Systems Analyst will report to the S & P Manager and the successful candidate must have at least 3 years' commercial systems experience and be able to develop new systems from scratch.

The successful Systems Analyst/Programmer will be responsible for specifying detailed systems designs from business specifications and be involved in all phases including programming and implementation. At least 3 years' systems design, plus programming in ICL COBOL is required. Progression to full Systems Analyst is assured.

CW2/6

SOFTWARE INNOVATION CONSULTANTS ANALYST PROGRAMMERS

Holland Salary up to 90,000 Guilders

A market leader in design and implementation of software systems in data communications wish to expand their Project Team.

Specialising in commercial, industrial and banking systems, a number of positions are available from Analyst Programmers to Senior Consultants.

In addition to a degree background, it is important to have had experience of data communications software using mini computers.

Major projects actively engaged upon include real-time (process orientated) systems switching and data transport network.

The Company offers in addition to a substantial salary, 1 full overseas relocation expenses, 2 holiday bonus, 3 resettlement advance, 4 initial accommodation allowance for you and your family, 5 assistance with house purchase, 6 medical attention scheme, etc.

You can also expect to visit our client in Holland prior to final contract.

هكذا من الأصل

CW2/9

SYSTEMS ANALYSTS PROGRAMMERS

Middlesex

An international computer company wishes to recruit a number of staff from all levels to help design, produce and market their electronic Data Processing systems.

Our client's marketing and service organisations cover over 25 countries with emphasis on the USA and Europe. Manufacturing is carried out in Ireland and Germany for the European markets. Research and development play a major role in the European network.

Systems Analysts with 3 years' commercial systems and design experience are required. Knowledge of COBOL and BASIC is necessary and candidates should be capable of working in a sales environment. You will probably be involved in manufacturing or be employed with a Software House.

Analyst/Programmers and Programmers with 2/3 years' programming and systems experience in BASIC and COBOL are also needed.

If you are interested in working for this highly motivated multinational company, and would like to earn an excellent salary, coupled with the usual generous benefits associated with an organisation of this type, we would like you to contact us.

CW2/7

CONSULTANTS

West London Based

Our client wishes to recruit an experienced Consultant to work in its first-class Bureau Services.

The successful applicant would be working in a small department which holds total responsibility for the company's user support division.

All our client ask from you is wide IBM MVS experience and the ability to deal with a large business system. The chosen candidates would be involved with all the Sales, Support Management and Marketing for this large Services organisation as well as being familiar with a consultancy and managerial role.

The successful candidate will be offered an above-average salary with the following additional benefits: Pension Scheme, BUPA, Sports/Social and Subsidised Meals.

If you would like to have interesting and varied work within this fast-moving company and be guaranteed excellent career prospects, please contact us.

CW2/10

(3959)

Holland via I.A.

SENIOR SYSTEMS ANALYST/PROGRAMMER required with a good knowledge of **DL/1** and **COBOL**. Hardware in use is an **IBM 4341** running under **DOS/VSE** and **CICS**. Knowledge of the **IBM COPPICS** package would be advantageous but not essential.

Applications to be worked on include an on-line production/inventory control system and other Materials Management Modules, plus the conversion of a Materials Management Information System from a 360 compatible machine to the new 4341.

Outlined above is one of our current requirements. Space and time make it impossible to list all the opportunities available. Therefore, if you would like to work overseas and for a highly-respected service company, please telephone or send your career resumé to me because I may well already have an excellent opportunity to offer you.

PLEASE WRITE OR TELEPHONE NOW

Ann Adidge,
Marketing and Recruitment Director
Industrial Artists Limited,
21 Bancroft, Hitchin, Herts
Tel (0462) 57141 (Day) or (0462) 700701
(Eve/Weekends)

IA is a registered Employment Business licensed by D of E.

Computing Services Unit

Two Senior Programmers

Applicants must have degree level qualifications and experience of GEORGE 2 on ICL computers. Knowledge of MAXIMOP, BASIC and/or FILETAB would be advantageous.

One vacancy is for a scientific programmer with experience of FORTRAN and ALGOL and preferably PASCAL or CORBAL. The other vacancy is for a programmer to be responsible for the maintenance and advice to users on applications software, including SPSS, MAG, PAFEC, computer graphics and microprocessor development aids.

A Union Membership Agreement is in operation under which new employees are required to join a recognised union.

Salary scale: Senior Programmers (T5) £6750-£7212 (increasing in April 1981).

For further particulars and application form, please send a self-addressed envelope marked S/971 (returnable by 17th January, 1981) to the Secretary, Manchester Polytechnic, All Saints, Manchester, M15 6BH.

MANCHESTER POLYTECHNIC

(3980)

UNIVERSITY OF NEWCASTLE-UPON-TYNE
COMPUTING LABORATORY

DEMONSTRATOR

Applications are invited for the temporary post of Demonstrator in the Computing Laboratory for a period of three years tenable from 1st April, 1981. Candidates in any area of specialisation will be considered. This post will be particularly attractive to a Ph.D. student who needs some extra time to complete his/her thesis.

Salary will be at an appropriate point on the Grade 1B (Bar) scale: £4,795-£6,985 per annum (under review), according to age, qualifications and experience.

Further particulars may be obtained from the Senior Assistant Registrar (F.P.), The University, 6 Kensington Terrace, Newcastle-upon-Tyne NE1 7RU, with whom applications (two copies), together with the names and addresses of three referees, should be lodged not later than 30th January, 1981. Please quote reference CW.

(3988)

Financial systems analyst

(m/f)

We are a growth oriented multinational manufacturing corporation, world renowned for our technical excellence in radiation chemistry. Our 25% annual compounded growth rate since our inception in 1957 is indicative of Raychem's leadership in industry.

To join a central group which is responsible for developing and improving systems in the financial/commercial area, we now wish to recruit a highly motivated systems analyst who will be based at our European head office in Brussels.

Candidate qualifications: ☐ at least three years of systems analysis experience of financial and/or manufacturing applications; ☐ the ability to work independently with different levels of management; ☐ a user oriented approach to problems; ☐ very good communication skills, requiring a good knowledge of the English language; ☐ knowledge of Cobol is desirable.

We expect a high degree of professionalism and enthusiasm. We offer a flexible, challenging environment with commensurate reward. Frequent short term travel within Europe will be necessary.

If you believe that you have the qualities and background required, then write in confidence to Mrs. Odette Vermeir, Personnel Department, Raychem Corporation, Leuvensesteenweg 31, B-1940 Sint-Stevens-Woluwe, Belgium. Telephone: 010-32-2-720.80.40.

Raychem

3926

Excellent Contract Opportunities

The following are a selection of our current Contract Assignments. However, we have a continuous requirement for skilled and dedicated Contract Professionals, so please make sure you are on our register.

UK ASSIGNMENTS

Mark IV Analyst/Programmers	
DL/1/COBOL Project Leader	London
DL/1/COBOL Senior Programmer	London
RPG/System 34 Analyst/Programmers	London
IMS/DL1 Database Designer	London
COBOL/CICS/DL1 Senior Programmer	N.W.
PL1/IBM Senior Programmer	N.W.
PDP/Pref COBAL Senior Programmer	N.W.
DMS 1100/TIP Database Designer/Programmer	S.E.
	N.W.

OVERSEAS ASSIGNMENTS

Assembler/IBM Analyst/Programmer	
IMS Analyst/Programmer	USA
Business Analyst	USA
PL1, COBOL/IBM Analyst/Programmers	London/Europe/M. East
Mark IV Analyst Programmers	M. East
Total/Environ 1 Analyst/Programmers	USA, M. East
	M. East

For more information telephone

Alan King,
TANGENT COMPUTER SERVICES
104/106 South Street
Romford, Essex
Tel: Romford 750201

THE POLYTECHNIC OF CENTRAL LONDON
Computer Unit

ADVISORY PROGRAMMER

Salary up to £6810

The person appointed will join a small and enthusiastic team supporting systems and applications software on DEC 10 and VAX11/780 computer systems, and providing advice and documentation for the staff and student users in all schools of the Polytechnic. A degree in a scientific discipline, with programming experience (preferably in Cobol) gained either during or after the degree course is essential.

Closing date: 22nd January, 1981.

Application form and further details from the Establishment Officer, PCL, 309 Regent Street, London W1R 8AL. (Tel: 01-580 2020 ext. 21).

(3916)

Polytechnic Graduate Diploma in Computer Studies

Students seeking sandwich employment January-September 1981.

All have good HND, proficient COBOL plus another language.

Please contact Janet Harris, Ref. BE112

North East London Polytechnic
Longbridge Road, Dagenham
RM8 2AS.
Tel: 01-590 7722 X2162

NELP

(3848)

Fraser Williams Computer Consultants

For career progression and challenge working on a variety of projects.

Fraser Williams, a leading national computer consultancy, provides a variety of data processing services to commerce and industry, covering a wide range of business equipment and systems. To maintain our growth we require skilled D.P. professionals at our CENTRAL LONDON and ST. ALBANS offices.

Programmers

To work within standards and estimates, as a member of a professional team on a variety of projects. You should have a solid background in application programming. Experience of COBOL and/or BASIC, based on varying machine environments, is preferable.

Prog./Analysts

You should have the attributes for our programmer requirements plus experience of designing commercial systems using various hardware. Prove that you can work with minimum supervision developing systems from your analysis and commercial understanding of client requirements.

Sen. Prog./Analysts

To manage small teams of programmers and Prog./Analysts working within set limits of costs and times. You should be able to communicate well with clients and have a proven record of implementing a medium size system from inception to client acceptance.

Salaries: commensurate with position and experience and are subject to regular reviews, plus a profit sharing bonus.

Ring Bernard Taylor on 01-388 0086 or write for an application form to: Fraser Williams (London) Ltd., 88 Warren St., London W1P 5PD.

LONDON · ST. ALBANS · LIVERPOOL · LEEDS · MANCHESTER · POYNTON · BIRMINGHAM
BRISTOL · SHEFFIELD · GLASGOW · TORONTO · NEW JERSEY

BOX Nos.

Box number replies should be addressed to:

Box No. ...
c/o Computer Weekly
Dorset House
Stamford Street
London SE1 9LU

CONTRACTS

STOP PRESS

IMS Designers & Programmers

Central London - Immediate Start

(3876)

D.P. Staff

Saudi Arabia **To £18,000 tax free**

Our client is a rapidly growing systems management company engaged in an international multi-disciplinary turnkey project using IBM 3032 and DG hardware operating in an IBM 370 OS/VS teleprocessing environment with microfiche terminals. The requirement is to fill the following positions

IBM Systems Programmers (2)

Involved in maintaining an innovative IBM 370 teleprocessing system with microfiche terminals. At least 3 years in-depth experience maintaining IBM OS/VS teleprocessing systems required, preferably CICS with 3270 terminals. Must be able to maintain systems singlehandedly.

Data General Systems Programmer (1)

Minimum 3 years experience programming DG equipment in assembler including responsibility for operating systems maintenance and generation. Experience in DG communications software, distributed processing, and IBM/DG communications, very desirable.

Data General Applications Programmer (1)

Several years experience with COBOL program development on DG computers using CS/40 package.

D.P. User Instructors (3)

Training Arab personnel in various user or computerized information systems. Knowledge of computer operations and/or COBOL programming coupled with instructor skills necessary. Complete fluency in Arabic essential. Travel throughout Saudi Arabia required.

For all positions a degree is very desirable. Contracts are negotiable on a 2 year basis with free furnished accommodation, free passage for family, free schooling for children; life and health insurance and other benefits. Send detailed career history, including professional references and salary record to:

J. D. Atcherley – quoting Ref. U895/CW
Executive Selection

AMS
Arthur Young Management Services
Rolls House, 7 Rolls Buildings
Fetter Lane, London EC4A 1NL.

(3926)

CHANGING JOBS? HOW?

By the grapevine?
By replying to adverts?
By getting on a job register?
Via an employment agency?

Each of these methods can bring good results. However, for the discriminating few who realise some of the drawbacks, there is a fifth option – to use a careers advisory consultancy such as EDP SYSTEMS LIMITED. Our procedure is to:

- have a frank discussion with you, to establish your strengths (technical and personal) and career aspirations
- advise you concerning the best current openings which could meet your objectives
- submit details of your background to selected clients, and progress your candidature through to a successful conclusion.

Our ability to help you is based on our considerable experience in the industry (established 1965) and our wide contacts – mainly in the UK but additionally in Europe, the Middle East and Australia.

This specialised service is offered free to DP professionals (programmers, systems analysts, project leaders, managers, engineers and salesmen) at all levels, but with a minimum of two years' practical experience. Due to a need to specialise, we are not able to offer assistance to operations staff.

Please ring in confidence for a preliminary talk, quoting reference PE/2, or leave a message on our answering machine and we'll contact you.

(2691)

EDP SYSTEMS 01.637 5796
52-53 Margaret St. London W1N 7FF

SYSTEMS PROGRAMMER

BATH, TO £11,000 + BENEFITS

An American owned furniture manufacturer located by the water front in Bath, is seeking an ambitious systems programmer. The installation houses an IBM 4300 and applicants should have a strong COBOL background, and preferably experience of DOS/CICS/MVS. This is a young and progressive company where staff are encouraged to use their initiative, and as well as an excellent salary, they can offer good working conditions, non-contributory pension, bonuses, four weeks' holidays and re-location expenses. If you are seeking a forward move in your career and living standards, call today, quoting ref. CW2077.

(3984)

01-486 8867
STIRLING EXECUTIVE PERSONNEL
128 WIGMORE STREET, LONDON W1H 9FE

PROGRAMMER RPGII/COBOL ICL 2903

We offer:

- Competitive salary.
- 4 weeks' holiday.
- Exceptional prospects.

Please contact, giving full personnel and Career details to:

S. J. SHARPLES
Dyteone Limited
Roebuck Road
Chessington, Surrey
KT9 1LN
Tel. 01-397 3366

(3953)

JBA

SAUDI ARABIA DEC Site Engineers

c.£15,000 TAX FREE

These are excellent opportunities for qualified and experienced Computer Engineers to maintain mini-computer business systems incorporating data communications networks. The work will be carried out on large DEC machines, so appropriate PDP 11/70 or 11/35 experience is essential. Applicants should have a minimum of three years experience in field service, have a flair for communicating technical information and be able to accept responsibility in mostly un-supervised environments.

Rewards

- Tax free remuneration
- Free accommodation
- Company car
- Middle East Allowances
- Full medical cover
- 20% increment for longer working hours
- Free flights back to the UK for holidays
- Kit allowances
- Performance bonus.

The appointments will be for at least 12 months on single status basis. If you feel that you would like to take this opportunity of working in the Middle East for a British company of high standing... **Contact: Margaret Stevens**

DEC Software Support

Saudi Arabia **up to £18,000 tax free plus benefits**

We have been retained by the DEC distributors in Saudi Arabia to recruit Software Specialists to assist with the installation and support of systems from their offices in Jeddah. Candidates should have at least five years experience on PDP 11's and be fully familiar with RSX 11, RSTS or similar software.
Ability to deal with customers and solve problems with minimum supervision is essential. This is a unique opportunity to join a fast-expanding group. A generous package is offered for single or married applicants. **Contact: Jim Baker**

Senior Systems Designers

London Based **up to £15,000**

Experienced Systems Designers are required immediately by our client, a leading computer consultancy, to take a key role in the design of a large real-time communications system.
Applicants should have at least six years in the design of mainframe (preferably ICL) applications and be capable of selecting hardware/software/packages for inclusion in a system. Direct involvement with database (DBMS), graphics or communications would be an asset.
Excellent salaries according to experience. Possible assignments in Birmingham.
Contact: Jim Baker

Senior Analyst/Programmers

London & Luxembourg £10,000+Overseas Allowances

Our client, a Swiss management Consultancy with offices in Zurich, Frankfurt and Luxembourg and specialising in banking and financial systems, wish to recruit professionals to take responsibility for particular areas of a large project.
The position will initially involve a 12 month period in Luxembourg as a senior member of a project team, designing, programming and implementing a Foreign Exchange dealing system, before returning to the U.K. to become a member of the London staff.
Three years experience of PDP 11/34 operating under RSTSE and programming in BASIC+ and preferably knowledge of financial applications are the main qualifications. Whilst abroad you will enjoy free accommodation and a daily overseas allowance as well as the excellent basic salary and benefits. **Contact: Brian Postles**

Senior Database Programmer

City **£10,000**

Our Client, a world-wide organisation, are currently involved in the design and implementation of a database and data dictionary. They need someone to provide technical advice, assistance and support on the use and facilities of IDMS.
A minimum of four years programming experience, with extensive knowledge of ASSEMBLER, IDMS and CICS. Two years of which should have been spent at a senior level. The Company are considering an update from IBM 370's to a 4300 in the immediate future, therefore, knowledge of 4300 series would be a definite advantage.
Contact: Janet Chilvers

Programmers – Real Time Systems

Hampshire **Up to £10,000**

This is an excellent opportunity to join the Systems Group of a recognised transnational organisation which undertakes the design, manufacture and commissioning of training simulators and industrial monitoring and control systems.
A minimum of three years experience of working on real-time industrial or military systems is essential. Candidates should preferably have a degree in Computing or Electronic Engineering and ideally a knowledge of PDP 11 with experience of MACRO 11 and RSX 11.
Salary will be negotiable according to age and experience and the usual range of large company benefits including a generous relocation package will be offered. There will be some opportunities for international travel. **Contact: Isobel Bruce**

Computer Resources Manager

Croydon Area **c.£9,000 – £9,500**

We have been retained by a well-established electro-mechanical and electronic engineering company to recruit for them a Computer Resources Manager to manage the day to day running of their PDP 11/34 site. The hardware is newly installed and initially will be implementing a Production Control package, although in the long-term other applications will be reviewed.
The successful candidate will be required to take control of the general operation of site and to co-ordinate with user departments and software manufacturers. Knowledge of DIBOL is preferable yet not essential, but a working knowledge of COBOL would be an acceptable alternative. Applicants would be expected to possess management skills required to liaise with senior managers of other departments. **Contact: David Hendry**

Programmers

Wembley Park **Up to £9,000**

A distributed multi-national company based in Wembley Park are currently developing an HP3000 system and so require a number of Programmers to support their teams. Candidates should have at least 2 years experience of COBOL programming, preferably gained in an HP3000 environment. Previous experience of Real-Time would be advantageous. Comprehensive training will be given in a number of areas. Usual large Company benefits apply. **Contact: David Hendry**

JAMES BAKER ASSOCIATES,
International Personnel Consultants,
32 Savile Row, London W1.
Tel: 01-439 9311.

3851

ENGINEER/ SCIENTIST

Camborne, Cornwall £6000-£9000+

(with computer bias)

The Camborne School of Mines is contractor to the Dept. of Energy and the EEC for a multi-million pound research programme to study the feasibility of commercially extracting energy from the granites of South-West England. The first contract phase will last until July 1983.

The project has reached the stage when computer facility is required and you would be responsible for the selection, installation and consequent running of the scientific based computer system. Preferably aged in your 20's or 30's you will be an engineer or scientist who has, in latter years, developed an interest in computers and their application. It is essential that applicants understand the requirements of scientists and engineers and are used to working in a high technology environment. It is expected that the languages used will be Fortran. Basic and Assembler and various real time operating systems will be utilised. A knowledge of French or German would be an advantage.

This vacancy is open to candidates who can be seconded from a relevant industry or who wish employment on the contract.

PER
Professional & Executive Recruitment

Contact:
Mike Trembath on
Plymouth (0752) 669561
or write to:
PER, Mayflower House, Armada Way, Plymouth

(3927)

Computer Auditor

£9387-£11282 p.a.

This post carries responsibility within the Regional Audit Team for auditing the systems and operations of a Regional Computer Centre which serves all Health Authorities in the South East Thames Region as well as London Postgraduate hospitals.

The Authority employs an ICL 19045 mainframe supported by a twin ICL 2904 installation. In addition, there are mini-computers for local and remote data capture and on-line interrogation facilities are to be developed.

The ideal candidate, man or woman, will be a qualified Accountant with sound practical computer and auditing experience gained at senior level, although it might also suit a suitably experienced, graduate level computer professional. Initial training will be given as required and there will be ample opportunities to keep abreast of developing technology.

Salary will be in the range £9,387-£11,282 per annum inclusive of London Weighting and there are good future career prospects either in the computer or finance fields.

Write for further information and an application form to the Personnel Officer, SETRHA, Randolph House, 46/48 Wellesley Road, Croydon CR9 3QA. Or telephone 01-686 8877 ext. 66 quoting ref. 103. Closing date for application 28th January.

South East Thames Regional Health Authority

(3958)

MERCHANT BANK SUBSIDIARY IN LEYTON

NEW ON-LINE ICL ME.29

Unique opportunity for Computer Person with 2-3 years' ICL experience to run own small Computer Department. Ideal opportunity. Must be able to handle all aspects of day-to-day computer processing including operating, programming and systems work.

Career opportunities in other areas of banking work.

Competitive remuneration package.

Apply in writing to Managing Director,

Close Brothers Limited
36 Great St. Helen's
London EC3A 6AP

(3862)

SYSTEMS PROGRAMMER

BATH, TO £11,000 + BENEFITS

An American owned furniture manufacturer located by the water front in Bath, is seeking an ambitious systems programmer. The installation houses an IBM 4300, and applicants should have a strong COBOL background, and preferably experience of DOS/CICS/MVS. This is a young and progressive company where staff are encouraged to use their initiative and as well as an excellent salary, they can offer good working conditions, non-contributory pension, bonuses, four weeks holidays and re-location expenses. If you are seeking a forward move in your career and living standards call today, quoting Ref. CW2077.

01-486 8867
STIRLING EXECUTIVE PERSONNEL
128 WIGMORE STREET, LONDON W1H 9FE

For a New Research Institute

in Saudi Arabia

UPM/RI/IPL/23 & 24/80:

An Applied Research Center to investigate contemporary problems in Energy, Petroleum, Petrochemicals, Geological Resources, Environment, and Organizational Development is being developed by the University of Petroleum and Minerals, Dhahran, Saudi Arabia.

The Research Institute needs -

SYSTEMS PROGRAMMER

to perform system generation with the IPL Manager at each update, and when required for other reasons; maintain software: identify software troubles, try to solve them with possible help from Manager or others, inform manufacturer about software troubles, with clear explanation, and perform patches sent by manufacturer, intervene and try to salvage programs at software crashes; maintain software library by integrating newly written or acquired software with the existing package; run diagnostics and thus help with identifying hardware troubles; help users with system operation and programming; write programs and routines clearly defined by users; perform image analysis, as defined by and with users; perform periodic system cleanups (disks, etc.); keep an account of system use for each user and for each subsystem; and perform operator duties when needed (not including corrective maintenance).

The applicant must have at least a B.S. Degree in Computer Science or related field, with minimum of 3 years programming experience, relaxable for candidates having an M.S. Degree. Programming experience must include assembly level and systems programming, as well as FORTRAN. Ability to write device drivers and also well defined scientific programs efficiently. Work on H.P. 3000 systems is desirable, but not necessary. Any I.P. work would be a plus.

OPERATOR/ TECHNICIAN

to perform system on and off functions; perform routine preventative maintenance (daily, weekly, monthly, etc.); perform requests from users to fetch, mount and dismount tapes, disks and films; load paper and ink into printers and plotters; operate film reader/writer, according to user supplied parameters; assist users in system operation (simple functions); maintain logbooks on all devices as well as a users logbook; maintain the magnetic tape and film library; keep track of consumable and spare parts, inform supervisor of low stocks; perform first intervention on failures, i.e. inspect, run diagnostic programs and try to identify source and nature of trouble; perform corrective action when possible (technically and contractually); inform supervisor of the trouble and advise, if necessary, to request service within the Institute or from outside (warranty or on call service from manufacturer); and be responsible for keeping a set of backup tapes to be updated every week.

The applicant must have a degree from a technical institute and training on instrumentation and electronic maintenance. Some experience with computers or scientific equipment as operator and/or maintenance technician. Preference for persons with knowledge and work with digital circuits, with electronic electromechanical manipulation capabilities.

Salaries are competitive and benefits include annual repatriation, housing, and transportation allowance.

The candidates are required to apply within one week of the release of this advertisement, sending detailed typed resume of their educational qualifications and experience, names and addresses of four referees, including their present employer, if possible, and giving information on their present position held, and attaching copies of their degrees and transcripts, last salary drawn certificate from the employer and a passport size photograph.

The applications may be sent to -

**The Acting Director of Personnel,
Research Institute, University of Petroleum and Minerals, UPM, Box No. 40, Dhahran,
SAUDI ARABIA.**

(3915)

Computer Professionals

Here are two exciting opportunities to develop a worthwhile, rewarding career with one of the world's most famous companies — Rolls-Royce Motors Limited.

We need experienced men or women to join us in the following positions:

Systems Analyst

Circa £7,500

Working as part of a small, highly skilled team you will be instrumental in developing new systems for our materials and production control users. Current applications include RPS/CPS on a DBOMP data base with on-line CICS terminals. For this you will, ideally, be educated to degree level with at least two years systems experience preferably gained in a manufacturing environment. Knowledge of IBM hardware, on-line applications and data base techniques would be an advantage.

Programmer

Circa £6,800

We need a programmer with at least 3 years experience preferably using PLI and CICS to work on a range of applications using a brand new IBM4341 under DOS/VSE and CICS. Some knowledge and experience of data base techniques and VSAM would also be an advantage. At present, on-line facilities are available with personal computing supported through APL and a new data base management system will be selected in the near future.

For each of the above positions we offer a first class employment package including 31 days paid holiday, company pension and sick pay schemes, preferential car purchase plan, subsidised canteen and excellent sports and social facilities.

Relocation assistance is available if required.

Interested? Then for further details and an application form please write stating briefly age, qualifications and experience to:—

Mr. J. McCaffery,
Personnel Officer,
Rolls-Royce Motors Limited,
Car Division,
Crewe CW1 3PL

Rolls Royce Motors

CONTRACT?

[illegible]

computer services

[illegible] Wardour Street, London W1V 3TB

BOX Nos.

Box number replies should be addressed to:

Box No.
c/o Computer Weekly
Dorset House
Stamford Street
London SE1 9LU

SENIOR SOFTWARE ENGINEER

A new post has been created for a Senior Software Engineer to help provide a high-quality time-sharing computing service to medical research workers at the Clinical Research Centre. The existing ICL 1903A will shortly be replaced by a DEC 20/60.

The successful applicant will be responsible for acquiring a detailed knowledge of the Tops 20 operating system and utilities of the new computer, for enhancing it and its user documentation. In conjunction with other staff, he/she will develop and implement a policy of software acquisition and maintenance. He/she will also be responsible, in both professional and managerial capacities, for the work of the division's junior software engineer and 3 analyst/programmers.

Applicants should have a good honours degree in computing science or an equivalent qualification, and at least six years' of appropriate experience. The salary will be superannuable, and not less than £9,500.

Application forms and further details may be obtained from Mr. A. Mariner, Staffing Officer, quoting Ref. 109/3/4100. Closing date 30.1.81.

(3928)

DEPARTMENT OF MECHANICAL AND PRODUCTION ENGINEERING

RESEARCH ASSISTANT/ DEMONSTRATOR

(£4893-£4884-£5088)

MICROCOMPUTER CAD/CAM SYSTEMS

A good honours graduate in engineering or computer science is required to introduce limited graphics to a low cost microcomputer and implement a CAD facility which will be linked to a two-axis machine table. The successful candidate will be expected to register for an MPhil/PhD. The appointment will commence on 1 April 1981.

Application form and further particulars from The Assistant Director (Administration) Trent Polytechnic, Burton Street, Nottingham NG1 4BU. Applications to be returned as soon as possible.

TRENT POLYTECHNIC NOTTINGHAM

(3959)

SYSTEMS PROGRAMMING MANAGER

£12,000+

Cambridge

Applicants should have about 5-7 years' experience in a technical IBM environment with good supervisory skills to lead a team. The company uses an IBM 3031 + DEC 20 computers. Experience of MVS, JES and TSO essential.

SYSTEMS PROGRAMMERS

To £10,500

Croydon

The company has a medium-sized installation using IBM hardware under VM/370 and DOS/VSE with CICS/VS and DL/1. If you have at least 2 years' relevant experience for this Croydon job or any other preferred location, we would like to hear from you.

SYSTEMS ANALYSTS

£7,000-£9,000

Various companies are seeking Systems Analysts with 18 months' to 8 years' systems analysis experience.

Locations: BRIGHTON, STANMORE, CAMBERLEY, BRENTFORD, WATERLOO, REDHILL, CROYDON, TUNBRIDGE WELLS, KINGSTON, SLOUGH, ALPERTON, SOUTHALL, WEST END, BECKENHAM and BOREHAMWOOD.

PROGRAMMERS

£ Various

Junior and Senior Programmers are also required in various areas.

Please phone for an Application Form or write, giving FULL details.

AMES PERSONNEL

(3783)

Employment Agency Suite 14, Drydon Chambers
119 Oxford Street, London W1R 1PA Tel: 01 434 1106

NEW YEAR—NEW CAREER?

MANCHESTER

SENIOR SYSTEMS ANALYSTS (TWO)

£8,500 PLUS BONUS

Analysts required with experience of IDMS. Strong financial background preferred. Large company benefits including relocation package.

LIVERPOOL

SENIOR PROGRAMMER TO £7,500

International company requires a Programmer with a minimum of 3 years' experience of Cobol. ICL background an advantage.

PROGRAMMER TO £7,000

Programmer with a minimum of 18 months' PL1 experience required by a large commercial organisation. Excellent company benefits including subsidised mortgage.

For details of these and many other vacancies in the north, please contact Laura or Chrissy on 061-428 3255/6 or Poynton 877818 after 6 p.m. and at weekends, or write to:

CW computer staff

(3981)

Software Development

Business Communications - Europe

Rare opportunity to get in at the formative stage of the development of exciting new systems by this world leading multi-national company.

You must have had considerable experience in real time software design and either the implementation of operating systems for real time systems or the design of telephony/data communication modules. Knowledge of stored programme controlled switching systems for telephone or data systems is required.

Senior Systems Designer — Up to £18,000

6-10 years experience after a relevant Master or Bachelor degree. You will control a small team, contribute to the total system design and be involved in the software packages. Ref: 4133/EF/CW.

Systems Designer — Up to £15,000

About 5 years experience after a Bachelor degree or a relevant period after HND. Controlling analysts/programmers you will be responsible for the design of programme modules. Ref: 4134/EF/CW.

Excellent conditions: this could be a career move or a contract (min 3 years). Good relocation terms with housing available in an attractive area on the Continent. Other large company benefits include 25 days holiday; medical aid and sickness schemes; profit sharing. English is the working language.

Please write in confidence giving full personal and career details or telephone 01-499 0342 for initial discussion quoting appropriate reference number to:

Robert Lee International
Management Consultants Limited
24 BERKELEY SQUARE, LONDON W1X 6AR

DATA PROCESSING STAFF

Saudi Arabia — Tax-free salary plus benefits

The Saudi American Bank is a rapidly expanding organisation in Saudi Arabia; we maintain three data centres in the Kingdom, each with two Perkin-Elmer 3220 computers, with 1 MB of memory each and 356 MB disc drives for on-line storage. Out of each data centre an on-line real-time banking system is run with terminals in remote locations. Now we are looking for a number of experienced data-processing professionals to take two-year contracts, with possible extension to help continue our expansion.

Systems Analysts

You should have at least three years' experience in transaction processing systems for an on-line real-time environment.

Experience of data-base management systems and automation projects for banking applications would also be expected.

You would be based at our head office in Riyadh.

Data Centre Operations Manager

To manage our three data centres we require Managers with two or three years' experience in a similar position, preferably with Perkin-Elmer computers. You should also have experience of installing and using Datacom hardware.

For all positions we offer an attractive tax-free salary, free furnished housing and regular lease with paid air transportation for your whole family.

Please send a full CV and salary history to:
Head of Personnel Recruitment, Saudi American Bank, P.O. Box 833, Riyadh, Saudi Arabia.

SAUDI AMERICAN BANK

WE HAVE MOVED!

PLEASE NOTE NEW ADDRESS

Classified DIRECT LINE 01-661 0121

[illegible]

Recruitment LOGISTIX **in Informatics**

Oil & Seismology

Central London: Salary to £12K

A well-respected Company participating in the development of advanced oil and seismic applications is seeking additional project team members for its central London operations. The Company currently runs a mix of recently installed mainframes with several manufacturers' minicomputers in an on-line and desk-top capacity. **Applications Programmers, Software Engineers and Systems Designers** should offer commercial experience in a TP monitor, DBMS or distributed processing environment. More important than specific programming languages used are the applications areas in which candidates have previously worked. Candidates will be considered to have relevant skills if they have programmed or designed in the areas of sales forecasting/budgetary applications, seismic and cartographic data analysis, production and materials control and spare parts/order scheduling. Salaries and fringe benefits are exemplary and will appeal to career orientated professionals. Ref L/2/A

Real-Time Applications

Holland: Salary to £16K

The Dutch division of an internationally renowned Systems and Software House currently requires additional **Consultants, Team Leaders, Analysts and Programmers.** Suitable applicants will be numerate graduates who have at least one year's real-time programming experience on any mini or micro computer. In-depth knowledge of an Assembler language is essential for all positions and of particular interest will be candidates who have specialist expertise in the field of Communications, Networks, Message Switching or Process Control. As a member of a small project team you will be involved in all stages of the design of a system through to the implementation. These positions will particularly appeal to individuals who have a desire to further their career whilst at the same time enjoying the experience of living in another country. Ref: L/2/B

Assembler Programmers

City of London: Salary to £12K

A renowned Financial and Investment Consortium established for many years within "The Square Mile" is seeking **Senior Applications Programmers** for its recently upgraded IBM installation. Candidates should preferably offer **Assembler Applications** programming experience, although COBOL or PL-1 Programmers should not be deterred from applying since re-training will be offered. The Company also uses IBM mini-computers which will eventually operate as part of a distributed processing network. The applications areas involved include Property and Portfolio Management, Debenture and Unit Trust Investment and Stocks and Shares Up-Date. Interviews will be held on the Company's premises in mid-January. Ref: L/2/C

Process Control Programmers

South London: Salary to £10K

A well-established Systems House specialising in the supply of Industrial Process Control Systems requires a number of real-time **Programmers** to join either its Customer Support or Software Development teams. Fluency in Assembler is essential and a knowledge of **RTL2, Coral** or **Fortran** will be an advantage. Applicants who have worked with a manufacturer or have exposure to Kent, Foxboro or Ferranti based systems will be particularly welcome. As the company has a number of overseas offices, candidates who express an interest in relocation to an E.E.C. country will be offered the opportunity to do so. In such circumstances, a working knowledge of a European language would be useful but not essential. Ref: L/2/D

Systems & Prog. Consultants

London: Salary to £16K

Over the last decade, our client, a leading Systems and Software Consultancy, has acquired an enviable reputation for providing a blue-chip service to various Users throughout the UK and Continental Europe. Current personnel requirements are for **Systems and Programming Consultants** to join specialist project teams working in the London area. Suitable applicants will have designed at least one complete system and will have a minimum of two years' programming experience on any commercial machine. Knowledge of both a high-level and low-level language is a distinct advantage with COBOL and Assembler being the most desirable. It is essential that you demonstrate the ability to liaise with clients and understand their problems. Ref: L/2/E

Communications Software

W. Germany: Pkg. to £18K

An established world leader in telecommunications products has urgent requirements for **Communications Software Specialists** to join existing project teams at its R & D Headquarters in Southern Germany. Experience in the design and development of specialised software for PBX or PABX systems is certainly advantageous but candidates with exposure to real-time systems software are also encouraged to apply. Of particular interest will be those able to demonstrate a knowledge of digital hardware concepts combined with microcomputer programming skills. In addition to a competitive salary, successful candidates will receive relocation expenses and an attractive benefits package. Ref: L/2/F

Customer Support

W. Home Counties: Salary to £10K

Due to the steady expansion of its client base a leading mini-computer manufacturer has recently opened a customer support centre to service the Western Home Counties and is now seeking to recruit additional **Programmers and Analyst/Programmers** to join its existing teams. At least two years' commercial programming experience combined with the ability to liaise with clients is essential as is fluency in either Cobol or Basic. Our clients have a stated preference for candidates with exposure to either D.E.C.'s PDP range or Systime's 5/5000 Series equipment. However, applicants with experience on any leading commercially orientated minicomputer should not be deterred from applying. Ref: L/2/G

Logistix, 10 Grenville Place London SW7 4RW

01-373 3063 LOGISTIX **Telex: 28800**

(3917)

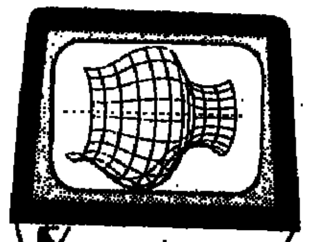
COMPUTERVISION EUROPE

"Computervision Europe, with operations in 10 European countries, is part of the Computervision Corporation, a major U.S. company, which is the world leader in the design and manufacture of Computer Graphics Turn Key Systems – one of the fastest growing high technology industries.

Computervision's Computer Aided Design/Computer Aided Manufacturing (CAD/CAM) systems, and comprehensive support services, are helping customers to increase productivity worldwide.

We are a young, dynamic, highly profitable organisation currently embarked upon a major expansion programme to satisfy market demand."

Computervision Ltd.



Productivity... by Design

Field Service Engineers Application Engineers

up to £10,000 + profit share + 2-litre car

* SOUTHERN ENGLAND * NORTH WEST
* THE MIDLANDS * YORKSHIRE

FIELD SERVICE ENGINEERS

up to £9,000

Working from home, the successful candidates will be involved with the installation, commissioning and on-going support activities to their respective customer base.

Candidates, with at least 2-3 years' field experience in the computer industry, should have experience of mini-computer systems and associated peripherals, ideally gained with a major manufacturer. Previous experience of CAD systems is not essential as product training will be provided at our Corporate Headquarters in the U.S.A.

APPLICATION ENGINEERS

up to £10,000

Working from a Regional Office, the successful candidates will provide some training and on-going application support services to both new and existing customers for our CAD/CAM systems.

Candidates should hold a relevant mechanical or electronic engineering qualification and preferably be familiar with the use of mini-computers. Experience of CAD/CAM, NC, PC/ES, and/or Piping/Civil Engineering would be a considerable advantage, although product familiarization will be provided.

Salaries will be as shown above plus profit sharing bonus, and the associated benefits package will include free BUPA and life assurance cover. Assistance will be given with relocation expenses, where appropriate.

We shall be commencing interviews in Regional Centres for these positions from 19th January 1981 so if you are interested please contact Mike Fuller, Customer Support Manager, or Bob Powell, Administration Manager, Computervision Limited, Penn Street Village, Amersham, Bucks. Tel: High Wycombe (0494) 714771, quoting Ref CV/12. Alternatively ring the 24 hour ASL Ansaphone Service on 01-629 1844 for an application form, quoting Ref CV/12.

These appointments are open to men and women.

Complete the coupon and return to Effectia Gravis, National House, 66 Wardour Street, London, W1V 3HP, for your next PERMANENT or CONTRACT job.

(BLOCK CAPITALS PLEASE)

Name (in full) ....

Address (permanent) ....

....

Telephone: Home .... Office ....

Type of Transport .... Date of Birth ....

Current Position ....
(Contract/Permanent) delete

Position Required ....
(Contract/Permanent) delete

Salary/Rate ....

Notice Required/Date Available (delete) ....

Areas Preferred: First Choice ....

Second Choice ....

Experience to date: (Last Position First)

Company: Name and Location	From Mth/Year	To Mth/Year	Duties and experience

Date .... Signature ....

Ref. No.
DATE

[illegible]

NATO MAINTENANCE AND SUPPLY AGENCY

located in LUXEMBOURG, is seeking an

EXPERIENCED SYSTEMS ANALYST

with at least 2 years' programming experience and 3 years' Systems Analysis in the areas of military or industrial systems design, to join an existing development team using IBM 4341, System 34 and peripheral equipment.

Candidates should have a university degree and preferably an additional qualification (e.g. Business Studies, Accountancy, Information Processing, etc.).

A working knowledge of French and English is mandatory.

Please write providing full personal and career details, not later than 10 JANUARY, 1981, to:

The Chief Personnel Division
NATO SUPPLY CENTRE
B.P. 13
L-8325 CAPELLEN

(3935)

UNIVERSITY OF SHEFFIELD

DATA PROCESSING OFFICER

(Scale £11,165 - £13,980 p.a.)

The post of Data Processing Officer will shortly be vacant following the resignation of Mr. Brian Woods. The successful candidate will lead a team of two analysts, three programmers and other staff engaged in maintaining and developing computer systems covering financial administration, staff and student records etc. for an organisation of nearly 10,000. A new Hewlett Packard 3,000 Series 44 Computer with full on-line facilities is due for delivery in April 1981. The vacancy is a senior one and calls for proven up-to-date computer expertise and the ability to work effectively with all levels. Experience in the educational field is very desirable and knowledge of management information systems would be an advantage. The appointment will be made on Grade 3 (£11,165-£13,980 p.a. Under review) with appropriate conditions of service. A job specification is available from Mrs. Hammond, telephone 0742 78555, ext. 4002.

Applications including a full curriculum vitae should be sent to the Director of Services, The University of Sheffield, Western Bank, Sheffield S10 2TN.

(3932)

U-C-A

'HAPPY NEW JOB TO ALL'

Analyst Programmers

Central London £8,000-£11,000

A large international company in Central London requires Analyst Programmers with a minimum of two years' IBM COBOL CICS experience. A Hewlett Packard background will also be considered for their on-line major application enhancement. This is an excellent firm with a first-rate career structure and perks that include flexitime, free lunches, non CPS and 4 weeks' holidays.

CW 2/1. Tricia

Salesmen Salesmen Salesmen

London & Home Counties to £20,000 O.E. + car

An established market leader wishes to expand his penetration of the mini/micro market by establishing Senior Salesmen to take charge of existing accounts whilst obtaining new business. A real chance to match your efforts with reward and managerial promotion after a reasonable period is well on the cards.

CW2/2 Michael

We also have 40 other Analyst/Programmer vacancies

Contract Programmer Analysts

To £450 p.w.

IBM Banking Experienced Analyst. Surrey. 3 months.
IBM 8100/3790 Prog. Surrey. 3 months.
IBM OS Cobol Jackson SP. Middlesex. 3 months.
TI 990 Cobol. Hants. 3 months.
UNIVAC 1100 DMS 1100. Sussex. 3 months.
IBM 4331 CICS DOS VS Cobol. London. 6 months.
IBM Cobol CICS DLI. Holland. 1 year.
IBM 4341 DOS VS Assembler CICS. France. 6 months.
PDP Assembler. Germany. 1 year.

PHONE: IRENE FOR DETAILS

UCA
01-995 3883
Recruitment Consultants
Universal Computer Associates Limited
Data Express House,
Prospect Place, London W4 3BR
(01-958 8138 Evenings)

Programming Opportunities Eastbourne, Sussex

Armour Pharmaceutical Company Limited, a U.K. subsidiary of the Revlon Health Care Group manufactures a wide range of leading pharmaceutical products at Eastbourne, Sussex.

We are currently undertaking a major expansion programme and will be taking delivery of a new IBM 4331 Computer early in 1981.

In order to achieve our project plans we are seeking to appoint the following staff immediately.

Systems Software Programmer

Reporting directly to the Manager, EDP, the Systems Software Programmer will be responsible for the generation and installation of DOS/VSE and installation later in 1981 of VSAM and CICS.

The successful applicant will have spent at least one year in IBM Systems Programming and must be prepared to accept responsibility. A keen and enthusiastic approach is required combined with the essential desire to get the job done.

Analyst/Programmer

Also reporting to the Manager, EDP, the Analyst Programmer will be required to take a leading role in the analysis and development of new projects. We plan to convert our existing systems from the present ICL 2903 Computer and to have the 4331 fully operational by autumn 1981.

Applicants should have a working knowledge of VSAM and/or CICS to ensure efficient implementation of data entry and on-line programs and to give guidance on the correct approach for future on-line development.

Knowledge of COBOL is essential and experience of RPG or Assembler would be desirable.

Applications Programmer

The Applications Programmer will be required initially to assist in the successful transition of Systems to the new 4331 and then to provide support in the development of new projects.

We are looking for applicants with a minimum of 18 months' experience in COBOL for an IBM Computer and knowledge of VSAM and/or CICS would be an advantage.

We offer a progressive salary structure, Pension Plan, Life Assurance, 21 days annual holidays, Sickness Benefit Scheme and other benefits associated with a successful Company which is part of a major International organisation. Relocation assistance to this attractive part of the country will be given where appropriate.

Please write giving full career details or telephone Eastbourne 21422 for an application form.

The Personnel Department, Armour Pharmaceutical Company Limited,
Brampton Road, Hampden Park, EASTBOURNE, East Sussex BN22 9AG.

(3958)

Armour Pharmaceutical Company

A FUTURE IN SCOTLAND

On behalf of our West of Scotland clients we are looking for ambitious professionals to take up important posts in their D.P. department. A multi-national concern with expanding interests, our clients have a major share of the UK market and increasing export figures. A highly profitable and therefore highly stable concern, their workforce is unaffected by the current economic recession.

The IBM installation offers both batch and on-line processing with future plans for new hardware already underway. Because of the successful nature of the company there are excellent opportunities for career progress and individual recognition.

PROGRAMMER circa £7,000

Candidates should have a minimum of one year's programming experience in RPG and can expect to be greatly involved in development programming.

SENIOR ANALYST/PROGRAMMER circa £8,000

Candidates should have an RPG programming background and experience of systems design. Responsibility for software would be given to the right candidate, from whom on-line experience would also be an advantage.

PROJECT LEADER
circa £9,000 + car allowance

The successful candidate will be involved in high level systems and database design and is likely to travel to installations throughout Europe. Applicants should be capable of working quickly and efficiently and would preferably have a wide experience, perhaps with a major company, and a knowledge of fiscal reporting. On-line experience would be a great advantage as would past involvement with RPG. The company, situated close to one of Scotland's many beautiful areas, offers normal large-company benefits, a generous relocation package and an outstanding opportunity for both security and job progression.

Please write to the address shown below, quoting reference 506 and listing on a seperate sheet those companies to which your reply should not be forwarded.

Harrison Cowley Recruitment
1a Hill Street, Edinburgh, EH2 3JR Telephone 031-225 9676.

CONTRACTS

SAUDI ARABIA

*CONSULTANTS, SYSTEMS ANALYSTS AND PROGRAMMERS
(SCIENTIFIC & COMMERCIAL)
3 to 6 Month Contracts

Experience should include at least two of the following requirements:

COBOL	IMS	IBM DATA DICTIONARY
PL1	TSO	IBM UTILITIES
FORTRAN	ADF	MARK IV
OS JCL		SPF USER DOCUMENTATION

LONDON

*IBM COBOL PROGRAMMER—RAMIS experience essential. Experience of ROSCOE, JCL, IMS AND MARK IV an advantage.
*RPG II PROGRAMMERS—for IBM System 3. C.C.P. experience required.

MIDDLESEX

*COBOL PROGRAMMERS—J.S.P. experience required.

Please reply A.S.A.P. to:
ALLAN ALEXANDER 01-622 2445, office hours or 01-688 7242

harris baldry consultants limited
D.O.E. Licence No. SE(B) 1516
101a Clapham High Street, London SW4 7TB (3984)

SMR
Sales & Marketing Recruiters Ltd
Victory House, 99 Regent Street, London W1R 7HB

SALES EXECUTIVES

Just in case you think we are merely the industry's leading supplier of career guidance for salesmen (to say nothing of sales training and market research!), we are currently recruiting candidates for over 100 selling jobs within more than 30 computer companies.

If you are seeking a career rather than just a selling job, contact Alasdair Scott or Alan Williams — we have the experience to understand your needs.

Tel: 01-734 9776

Systems Management

Trusthouse Forte, the market leader in hotel, catering and leisure activities, is expanding its systems and D.P. function to meet the challenge of the future, and has two senior vacancies:

Group Systems Manager — reporting to the Director of Group Systems, you will advise him and Divisional line management on D.P. systems and equipment throughout the Group, and will also be responsible for the overall control of the implementation of specific D.P. projects.

You should have extensive data processing experience and have worked with many suppliers and clients. You will have the tenacity, ability and personal motivation necessary to achieve excellent results, together with a high degree of professionalism and integrity.

Senior Systems Analyst — Hotels — Reporting to the Divisional D.P. Manager, you will be part of a small team, responsible for the selection, implementation and support of computer systems in our Hotels Company. You must have practical experience of developing systems, together with an in-depth knowledge of a wide range of hardware, particularly minicomputers. You will probably be in your late twenties and have the ability to communicate effectively with staff and management at all levels.

These are senior appointments which carry attractive salary and benefits packages; together with exciting career prospects. Office locations in Central London.

Please apply, stating which job you are interested in, and giving full details of qualifications, career history, age and current salary to: C. G. Forbes, Group Personnel Manager, Trusthouse Forte Limited, 7 Hanover Square, London, W1R 0PS.

3986

TRUSTHOUSE FORTE GROUP

RECRUITMENT KINGSTON £££

We are an expanding Recruitment Consultancy currently operating from 3 UK centres and urgently seek an ambitious person interested in recruitment as a consultant for an expanding DP market.

You will work initially with a senior consultant in our Kingston office and receive the full training that only a professional organisation can offer. (The rest is up to you!)

You will easily increase your present income if you are determined and have experience in the DP field.

Telephone Alan Sanders for an interview today. (3964)

01-549 6441 AB EXECUTIVE

CONTRA
RING 01-439 3671 NOW
HEXAGON computer services
Hexagon House, 105 Wardour Street, London W1V 3TB
(3988)

THE SALES BIT

The six-month 'guarantee' is a deception

IN the last issue I dealt with advances against potential commission earnings for sales recruits and the implications of making such payments returnable. I also touched on the relationship between this situation and the responsibility of field sales management to monitor the performance of new recruits.

The withdrawal or non-existence of a scheme for providing an initial minimum income guarantee can lead to a variety of problems involving both existing and potential sales personnel. For those inside the company who are already beyond the normal guarantee period, the ramifications of withdrawing the "guarantee" system are minimal. There may perhaps be some negative debate about why the company thought it necessary to have it removed — cash flow, declining sales, autocratic impulse.

For those currently within the guarantee period the reactions are likely to be the same, unless the scheme is withdrawn overnight as opposed to being phased out. The latter route can lead to a variety of problems, with breach-of-contract the least of the worries. The infliction of "instant insecurity" must have a variety of demotivating effects. The prospect of possibly having to pay money back to one's employer at a given point in time can soon become a focal point that overrides all activities and considerations other than finding a more secure job and keeping up the mortgage payments.

Confidence

The biggest problem occurs when it comes to recruiting new salespeople. It's all very well for a senior executive to say that the kind of salesmen he wishes to recruit are aggressively enthusiastic with absolute confidence in their ability to succeed without the crutch of a non-returnable guarantee. A salesman may be totally convinced of his ability to sell, but he cannot have the same conviction about a company and product he does not know. On-the-outside-looking-in, one computer product looks much the same as another. He sees a non-returnable advance against commission as a token of a company's confidence in itself and its products. How can he apply himself totally to the process of getting the new job "off the ground" when the real prospect of being unable to meet his financial obligations is waiting six months down the line?

Why should he, when there are plenty of other good companies around ostensibly with equally good products and prospects, which will provide the minimum income he needs without clawing it back if things don't work out?

"If things don't work out!" It is easy for an employer to assume that the only reason a new salesman fails is because of his own ineptitude.

This is far from the case. In my experience the main reason why many salesmen fail to earn an income in excess of the initial advance against commission is due to a total misconception on the part of management as to how long the guarantee period should be. The normal practice is to take a figure out of the air — 12 months, six months, a fortnight. What's everyone else doing?"

Ignorance

It is essential that sales management consider what an advance against commission is intended to achieve in their particular case and how long it should last, bearing in mind induction, training, prospecting, the selling cycle, and delivery. The six months "guarantee" offered by most companies at present is a deception in many cases when analysed from this viewpoint, brought about more by ignorance than malice.

There is a host of other reasons why a salesman can fail to bring his earnings up to the level of the advance against commission during the prescribed period, all factors completely beyond his control and with a direct effect on his income: Economic recession (this alone could make a joke of many sales targets in 1981); delayed new product announcements or deliveries; insufficient production capacity; hardware/software problems; underestimated "selling cycle"; late deliveries; importation problems; inadequate field sales management; inept local technical and sales support; undermanning; field engineering problems; company cash-flow; extended training; reorganisation and relocation; inadequate product; inadequate (or even non-existent) marketing and promotion; inadequate documentation; bad press; overpricing; virgin territory — need I say more?

From the point of view of a new sales recruit, the non-returnable minimum income guarantee is an insurance against such possibilities.

Burden

Clearly, every sales manager wishes to recruit already successful salesmen, who in turn have to consider the risk of throwing away their current prospect portfolio and moving from the security of a company where their talents and capabilities are identified, to the unknown of a new employer. To do so with the added burden of financial insecurity is an unreasonable, and fortunately in the case of most computer companies, an unnecessary hazard. Despite the recession there are still more selling jobs available than there are adequate people to fill them.

So this kind of potential problem can be avoided.

The question of initial advances against commission earnings need not be a complicated one. It is really a question of having sufficient flexibility and awareness to relate the guarantee period to the company's product and marketplace, the needs of the individual and the responsibilities of field sales management.

TRADER

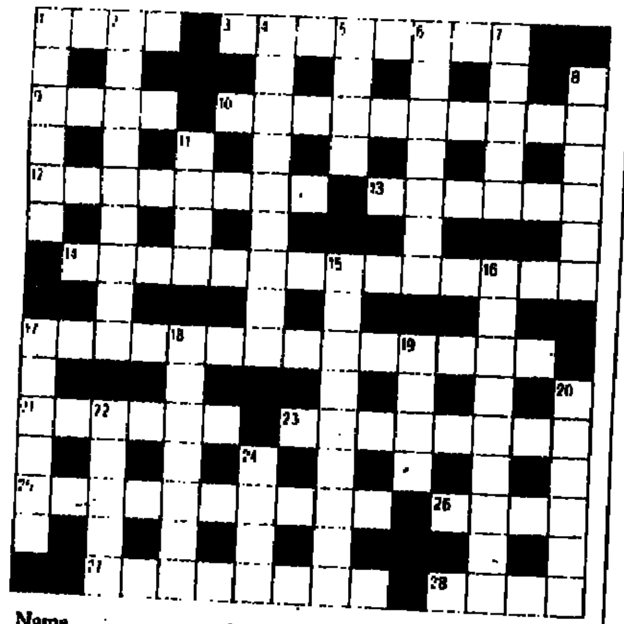
Puzzle Answer

AT the moment when the train entered the tunnel, the second man still had one-fifth of the length of the tunnel to traverse. He only just made it, so his speed must have been one-fifth that of the train — 10 mph.

CW Prize Crossword 12

Compiled by Alec Robins

A prize of £10 will be awarded for the first correct entry opened. The second and third solutions opened will receive £5 each. Entries to Crossword Competition, Computer Weekly, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS, by first post Friday, January 16. Please use a ballpoint to complete the crossword and include a telephone number where you can be reached during the daytime.



Name.......................................(Miss, Mrs, Ms, Mr)

Address.......................................

....

Telephone.......................................

I accept the rules and conditions of the Computer Weekly Crossword Competition.

Signed.......................... Date..........................

ACROSS

1. Caught the Huns' leader, a barbarian (4)
3. A fall from a hillside's also observed in a bad spill (8)
9. Crazy cricketers (4)
10. Branch of learning that writers study, and possibly rue it later (10)
12. Fail to notice what superintendents do (8)
13. Look for a bird (6)
14. The splendidly elite sailor often has home around the East (4,2,3,5)
17. Live very thriftily, as thieving poor fiddlers do? (5,3,6)
21. Silver found in the pool is scanty (6)
23. A rustic, perhaps, badly interred in a crude grave (8)
25. Players I confined within bounds and told off (10)
26. Half of us, with expert about, paint coarsely (4)
27. Prime Minister is taken aback in case that's most ordinary (8)
28. The boss has to meditate endlessly (4)

DOWN

1. Animal trap catches Bob, unfortunately (6)
2. Brine that ruined a parson's corn-store (5-4)
4. One swell tucking into a cake for a lark (1,3,2,3)
5. A fight expected with Liberals, initially (4)
6. Have a smoke concealed in shelter and foliage (7)
7. Type of boat kept in a lake for the sovereign (5)
8. Want former coppers on the land (6)
11. The fool gets left in bed (4)
15. The man's beginning to sprint round one street in hurry (9)
16. Rising up in the course of ruling is distasteful (9)
17. Inverted cloth bundle for cleaning, one that's used in cider-making (6)
18. The girl is invested in an Order for bravery (7)
19. Annoy king and upset priest (4)
20. Quietly dressed, getting examined searchingly (6)
22. Stupid fellows, making girls go topless (5)
24. Cry about everything (4)

C.A.C.I.

Analyst/Programmers

London £6,000-£10,000

CACI has established a leading position in a rapidly growing application area: the creation and supply of specialised marketing data. Our customers now include many of the country's largest companies.

We need analyst programmers with at least two years' experience to work on our DEC VAX 11/780 delivering projects and developing FORTRAN systems for—

- Interactive data retrieval
- Mapping
- Statistical analysis
- Large database

If you are a graduate with the initiative to work with little supervision and the potential to become a project leader, CACI can offer you:

- Excellent salary
- Bonus scheme
- Rapid career development
- Stimulating working environment
- Interesting and varied applications

CACI is a highly successful international software company. We grow 50% each year and currently employ over 1,000 people in Europe and America.

Apply: Market Analysis Group, CACI, 289 High Holborn, London, WC1V 7HZ. 01-405 2245.

(3942)

LONDON BIRMINGHAM DUBLIN AMSTERDAM HAMBURG GOTHENBURG

READVERTISEMENT

Microelectronics Education Programme

Applications are invited for a post on the small management team being established to run the Government's Microelectronics Education Programme, which will consist of a range of coordinated projects commissioned through national bodies, local organisations and individual schools and colleges. The appointment will be for a fixed term, ending on 31 March 1984. Secondment from an existing post will be possible. The Programme Team operates from offices in Newcastle upon Tyne.

MANAGER (TECHNOLOGY)

To have particular responsibility for projects dealing with

- the teaching of electronics, control technology and associated topics
- the development of teaching materials dealing with the technology of microelectronics
- special education

The Team will also look to the Manager (Technology) for technical advice on microelectronics. A requirement of the post will be to visit projects throughout England, Wales and Northern Ireland.

Applicants will need both educational and technical experience.

Salary on a scale from £7360 to £9088 (Administrative Officer).

Applicants may ask for assistance with removal expenses.

Closing date for application: 26 January 1981.

Fuller details of the post are available from The Office Manager, Council for Educational Technology, 3 Devonshire Street, London W1N 2BA.

(3946)

Programming Professionals

up to £12,100 Harlow

As a result of continuing expansion of our activities and internal promotion, we need first class professionals to work in project teams developing and maintaining group-wide commercial applications on Univac 1100, ICL 2900 and DEC computers. Batch, interactive and database systems are being developed, with applications including financial, accounting, marketing, shipping and inventory control.

You should have about 3 to 5 years' COBOL experience and although a degree is not essential, you should be of graduate calibre to match the exacting requirements of the posts. Experience in one or all of the machines we use and in FILETAB, TPS or Jackson structured programming would be an advantage.

Salaries are in the range of approximately £7,300 to £10,700 and £8,200 to £12,100 depending on experience. Career development opportunities are first class. Benefits include generous relocation assistance, if appropriate, to this pleasant part of West Essex, a non-contributory pension scheme, subsidised lunches and excellent sports and social facilities.

Please write or phone for an application form by January 16th to: Roy Lecky-Thompson, Personnel Co-ordinator, The British Petroleum Company Limited, BP House, Third Avenue, Harlow, Essex CM19 5AG. Tel: Harlow (0279) 26851, ext. 2621.

BP Harlow

SYSTEMS ANALYST

KENT

Good systems analysis experience required, this having been gained in a commercial environment.

Contract to start end of January for a minimum of 6 months.

Please contact DAPHNE JONES.

(3981)

FORCE 8
Computer Services
8 Mint Walk, Croydon
01-680 3761

BOX Nos.

Box number replies should be addressed to

Box No. ....
c/o Computer Weekly
Dorset House
Stamford Street
London SE1 9LU

BANKING DP EXPERIENCE?

Established Software House specialising in the provision of software and consultancy support to Banks and other financial institutions, both in the U.K. and abroad, would like to hear from freelance analyst/programmers with a suitable background with a view to undertaking short, medium or long-term assignments.

Experience should include at least one of the following machines and languages:

IBM System/34, NCR 8250, Burroughs B80/B800, DEC PDP/11, COBOL, RPG II, BASIC.

Please send c.v. and other relevant details to Box No. 1120.

GUIDE TO RECRUITMENT CONSULTANTS IN THE U.K

LONDON & H. COUNTIES (LH). MIDLANDS (M). NORTH (N). SCOTLAND (S). OVERSEAS (O) NORTHERN IRELAND

ALL COMPUTER STAFF NEEDS
ESCO Management Consultants Ltd
Professional, reliable, confidential
Write 77 Botanic Avenue, Belfast BT7 1JL or phone Belfast (0232) 49085
(3962)

Ivor Norton Management Services Ltd
Recruitment Consulting Division
62 Shaftesbury Avenue, London W1V 7DE
01-734 8862 (24 hours answering service)
P.O. Box 65, Copthall Tower House, Harrogate HG1 1TS. Tel: Harrogate [illegible]

FOR CLIENTS AND APPLICANTS IN UK AND OVERSEAS
Alex Daly
COMPUTER STAFF APPOINTMENTS
134 St. Vincent St., Glasgow
041-221 4166/9
Also at Edinburgh and Aberdeen

Computer Professional Recruitment Consultancy
"COMPUTER PROFESSIONALS — MAKE SURE WE HAVE YOU IN MIND"
[illegible]

TEMPORARY AND PERMANENT COMPUTER PROFESSIONALS
[illegible]

FOR THE BEST PERMANENT AND CONTRACT JOBS IN THE NORTH OF ENGLAND
[illegible]

COMPUTER INDUSTRY SPECIALISTS
SALES • SYSTEMS • MARKETING • ENGINEERING • PROGRAMMING
INSIGHT MARKETING & PERSONNEL CONSULTANTS LTD.
AUSTIN HOUSE, CHARLOTTE STREET, MANCHESTER. TEL. 061-236 7025

ALL COMPUTER STAFF NEEDS
ESCO MANAGEMENT CONSULTANTS LIMITED
77 Botanic Avenue
Belfast BT7 1JL
Tel: Belfast 49085
Professional, reliable, confidential

D.P. Permanent & Temporary Recruitment
MANCHESTER Maureen A. Ingle Tel: 061-236 7030
LEEDS John [illegible] Tel: 0532-[illegible]
Minerva Computer Personnel
[illegible]

FOR FURTHER DETAILS OF THIS WEEKLY FEATURE CONTACT OWEN KELLY [illegible]

MYRIAD

SYSTEMS ANALYSTS

WEST LONDON — **TO £10K + BENEFITS**

IBM 4300
NEW SYSTEMS DEVELOPMENT

Only very occasionally does an opportunity arise to join a data processing department which is moving into new areas of its company's business to provide a professional and effective information service.

The successful and expanding business of our client offers such an opportunity for an ambitious commercially-minded analyst to play a key part in the development of new systems based upon an IBM 4300 mainframe.

The computer applications involved are stimulating in both the business and technical sense and therefore applicants will find that the potential for their own development is fully within their control.

The importance that the company places upon this appointment is reflected in the attractive commencing salary which will be offered to the successful candidate.

Ref: NW1/0801

PROJECT MANAGERS ANALYST/PROGRAMMERS TEAM LEADERS

C. LONDON — **£8,000-£12,000**

The retail industry is becoming increasingly sophisticated and is still growing healthily. Our Client, a frontrunner in this industry and a household name has a vast number of outlets with a wide geographic spread. The growing size and complexity of their retail operations has led them to embark upon a major project to extend their interactive communications system.

This ambitious project has created the need for additional Analyst/Programmers, Project Managers and Team Leaders with a commercial systems background. Analyst/Programmers should possess a minimum of TWO YEARS' COBOL experience.

A substantial benefits package together with competitive salaries combine to make this an attractive opportunity to secure your future.

Ref: C1/0801

SENIOR ANALYSTS

MOVE TO FIVE FIGURES

SOUTH HERTS — **£10,000 + +**

Our client offers:

★ New development
★ Project responsibility
★ Professional business environment
★ IBM Hardware + TP & Database
★ Planned career progression
★ Regular education & training

You need:

★ Innovation, energy & resolution
★ Previous project success
★ Leadership qualities
★ Programming background
★ Good liaison qualities
★ Drive and ambition

The company is a highly successful organisation and offers a full range of employee benefits and job security.

Ref: N1/0801

NEW IBM INSTALLATION

ANALYSTS AND PROGRAMMERS

Middlesex — **To £10,000**

Additional Analysts and Programmers are required now to enhance the Systems and Programming Team of a major organisation able to offer a secure future and positive career development.

A range of interesting and varied systems are scheduled for development and implementation on a new IBM 4331 to be delivered in 1981.

PROGRAMMERS should have at least two years' experience programming in COBOL or RPG II on IBM or compatible hardware.

ANALYSTS should possess a programming background and over two years' analysis experience.

An outstanding benefits package combined with the opportunity to gain formal training and move to IBM hardware make this a challenging and valuable career move.

Ref: C2/0801

IBM + MINI NETWORK

A large international company is expanding its data processing operation by adding a network of mini computers to its powerful IBM mainframe. These small machines will support DATABASE applications and all programming is in COBOL.

NORTH SURREY

PROGRAMMERS — **c.£7,000**

To specify and develop COBOL programs, applicants will have a good academic record with a minimum of twelve months commercial experience, preferably gained in an IBM environment.

ANALYST/PROGRAMMERS — **£8-£9,500**

These positions require systems analysis/design knowledge and will have the extra responsibility for project implementation and the supervision of programming staff.

The Company offers employee benefits commensurate with other major organisations and is very accessible by road and rail.

Ref: S1/0801

ASSEMBLER IN ESSEX

c.£8,500

This is an ideal opportunity for IBM ASSEMBLER Programmers to make that important next move to establish themselves on an exciting career path.

Our client, a leading company in their field, is seeking additional programming staff to contribute to an extensive data processing development programme over the next five years. Full use will be made of Database and Real-time techniques.

The Company can offer you pleasant working conditions, up-to-date IBM hardware, an excellent salary and benefits, and the opportunity for positive progression to senior positions within the company.

If you would like to find out more about the excellent opportunities open to you, call Myriad now and discuss your future.

Ref: E1/0801

(3356)

MYRIAD APPOINTMENTS LIMITED
30 Fleet Street London EC4Y 1AA Telephone 01-353 0981 24 hours